EXHIBIT A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re *Ex Parte* Reexamination of:	
U.S. Patent No. 10,838,135	
Issued: November 17, 2020	Group Art Unit: To Be Assigned
Named Inventor: Sergiy Vasylyev	Examiner: To Be Assigned
Control Number: To Be Assigned	
Filed: December 20, 2019	
Title: EDGE-LIT WAVEGUIDE ILLUMINATION SYSTEMS EMPLOYING PLANAR ARRAYS OF LINEAR CYLINDRICAL LENSES	**<u>VIA EFS-Web</u>**

Mail Stop *Ex Parte* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

REQUEST FOR *EX PARTE* REEXAMINATION

Requester Acer Inc. respectfully requests *ex parte* reexamination under 35 U.S.C. § 302 and 37 C.F.R. § 1.510 of U.S. Patent No. 10,838,135 ("the '135 patent," Ex. A), assigned to Patent Owner SVV Technology Innovations, Inc., per the assignments at reel/frame: 037296/0211. Prior art not cited or applied during prosecution renders issued claims 1 and 16 unpatentable under 35 U.S.C. § 103.

As this Request demonstrates, prior art references, including at least *Mitsuru* and *Gandhi*, raise substantial new questions of patentability ("SNQs") with respect to claims 1 and 16. Indeed, this prior art renders these claims unpatentable under 35 U.S.C. § 103. Acer thus respectfully

requests that the Office grant this Request for *ex parte* reexamination of the ’135 patent and cancel claims 1 and 16.

In accordance with 37 C.F.R. § 1.510(b), this Request includes the following:

> (1) A statement pointing out each substantial new question of patentability based on prior patents and printed publications.
>
> (2) An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited prior art to every claim for which reexamination is requested. For each statement of the patent owner and accompanying information submitted pursuant to [37 C.F.R.] § 1.501(a)(2) which is relied upon in the detailed explanation, the request must explain how that statement is being used to determine the proper meaning of a patent claim in connection with the prior art applied to that claim and how each relevant claim is being interpreted. If appropriate, the party requesting reexamination may also point out how claims distinguish over cited prior art.
>
> (3) A copy of every patent or printed publication relied upon or referred to in paragraph (b) (1) and (2) of this section accompanied by an English language translation of all the necessary and pertinent parts of any non-English language patent or printed publication.
>
> (4) A copy of the entire patent including the front face, drawings, and specification/claims (in double column format) for which reexamination is requested, and a copy of any disclaimer, certificate of correction, or reexamination certificate issued in the patent. All copies must have each page plainly written on only one side of a sheet of paper.
>
> (5) A certification that a copy of the request filed by a person other than the patent owner has been served in its entirety on the patent owner at the address as provided for in [37 C.F.R.] § 1.33(c). The name and address of the party served must be indicated. If service was not possible, a duplicate copy must be supplied to the Office.
>
> (6) A certification by the third party requester that the statutory estoppel provisions of 35 U.S.C. [§] 315(e)(1) or 35 U.S.C. [§] 325(e)(1) do not prohibit the requester from filing the *ex parte* reexamination request.

Attachments

(1) Certificate of Service on Patent Owner.
(2) Information Disclosure Statement Form PTO/SB/08.

Exhibits

Ex. A: U.S. Patent No. 10,838,135 to Sergiy Vasylyev ("the '135 patent").
Ex. B: Patent Prosecution History of U.S. Patent No. 10,838,135.
Ex. C: Declaration of R. Flasck.
Ex. D: *LCD Backlights*, Wiley Online Library (last visited Nov. 26, 2024), https://onlinelibrary.wiley.com/doi/book/10.1002/9780470744826.

Prior Art Exhibits

PA-1: Japanese Unexamined Patent Application Publication No. JP 2006-114239 to Mitsuru Kamikatano et al., published April 27, 2006, including certified translation ("*Mitsuru*").
PA-2: U.S. Patent No. 7,876,489 to Jignesh Gandhi et al. ("*Gandhi*").
PA-3: U.S. Patent No. 5,751,386 to Toshiyuki Kanda et al. ("*Kanda*").
PA-4: Shunsuke Kobayashi et al., *LCD Backlights* (John Wiley and Sons, Ltd., Apr. 16, 2009) ("*Kobayashi*").
PA-5: U.S. Patent No. 7,918,597 to Toru Kunimochi ("*Kunimochi*").
PA-6: U.S. Patent No. 7,777,834 to Shin-ichi Uehara et al. ("*Uehara*").
PA-7: Eugene Hecht, *Optics* (Addison-Wesley Publishing Company, Inc., 2d ed. 1990) ("*Hecht*").
PA-8: U.S. Patent No. 7,587,117 to Roland Winston et al. ("*Winston*").
PA-9: Adi Abileah, *LCD Backlight Methodology and Applications Using Optical Enhancement Films*, Information Display, Vol. 24, No. 8, pp. 28-33 (Aug. 2008) ("*Abileah*").

Litigation Document Exhibits

L-1: Plaintiff's Complaint for Patent Infringement, *SVV Technology Innovations Inc. v. Acer Inc.*, No. 6:22-cv-00640-ADA, Dkt. 1 (W.D. Tex. June 21, 2022).
L-2: Joint Claim Construction Statement, *SVV Technology Innovations Inc. v. Acer Inc.*, No. 6:22-cv-00640-ADA, Dkt. 44 (W.D. Tex. Mar. 16, 2023).
L-3: Claim Construction Order, *SVV Technology Innovations Inc. v. Acer Inc.*, No. 6:22-cv-00640-ADA, Dkt. 49 (W.D. Tex. Apr. 6, 2023).
L-4: Verdict Form, *SVV Technology Innovations Inc. v. Acer Inc.*, No. 6:22-cv-00640-ADA, Dkt. 158 (W.D. Tex. June 6, 2024).
L-5: Expert Report of Thomas L. Credelle Regarding the Validity of SVVTI's Patents ("Credelle Rpt.").
L-6: Redacted Trial Transcript, *SVV Technology Innovations Inc. v. Acer Inc.*, No. 6:22-cv-00640-ADA, Dkt. 173 (W.D. Tex. July 17, 2024).

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I. RELATED PROCEEDINGS

A. Certification Regarding Statutory Estoppel

As required by 37 C.F.R. § 1.510(b)(6), Acer certifies that the statutory estoppel provisions of 35 U.S.C. § 315(e)(1) and 35 U.S.C. § 325(e)(1) do not prohibit Acer from filing the instant request for *ex parte* reexamination.

B. Other Proceedings

SVV asserted the '135 patent against Requester in a lawsuit captioned *SVV Technology Innovations Inc. v. Acer Inc.*, No. 6:22-cv-00640-ADA (W.D. Tex. June 21, 2022). *See* L-1. On March 16, 2023, the parties submitted a Joint Claim Construction Statement agreeing to the construction of certain terms addressed in this Request. *See* L-2. On April 6, 2023, the Court issued a Claim Construction Order, construing certain claim terms addressed in this Request. *See* L-3. A jury trial commenced on June 3, 2024. And on June 6, 2024, the jury reached and returned its verdict finding that Acer infringed claim 16 of the '135 patent and that claim 16 was not invalid. L-4 at 4, 6, 9. At the time this Request is filed, the Court has entered judgment, but that judgment is not a final judgment. Acer has filed post-trial motions for judgment as a matter of law and for a new trial, which are currently pending. Even if the district court denies Acer's post-trial motions, the time for appeal has not yet expired.

C. Request for Expedited Reexamination

Due to the ongoing nature of the above-identified lawsuit, Requester respectfully urges that, pursuant to 35 U.S.C. § 305, this Request be granted and reexamination be conducted not only with "special dispatch," but also with "priority over all other cases" in accordance with M.P.E.P. § 2261.

II. IDENTIFICATION OF CLAIMS THAT SHOULD BE REEXAMINED

Under 37 C.F.R. § 1.510(b)(2), Acer respectfully requests *ex parte* reexamination of claims 1 and 16 of the ’135 patent and the issuance of a reexamination certificate cancelling these claims.

III. BACKGROUND OF THE TECHNOLOGY

A liquid crystal display (“LCD”), such as those used on mobile phones, notebook computers, or computer monitors, is a transmissive device and does not itself produce light. Ex. C ¶ 42; *Abileah* at 28. An LCD requires a bright and uniform light source behind the LCD panel to spread light over the surface of the LCD. Ex. C ¶ 42; *Abileah* at 28. A backlight unit provides this uniform light source. Ex. C ¶ 42; *Abileah* at 28.

LCD backlight units can be direct lit, where the light source is directly behind the display panel, or edge lit, where the light source is on the side of the display panel. Ex. C ¶ 43. Edge-lit backlights are thinner, allowing for a thinner display. *Id.* Given the constant pressure for thinner devices, more and more products have adopted edge-lit displays. *Id.*

By the priority date of the ’135 patent, edge-lit backlights were well known and typically consisted of at least the following components: (1) a light source, such as a cold-cathode fluorescent lamp (“CCFL”) or light-emitting diodes (“LED”); (2) a light guide plate used to direct the light emitted from the light source toward the LCD; (3) a reflector on the back surface of the light guide plate; (4) a diffuser to ensure the light from the light guide plate is uniform; and (5) a lens sheet (also referred to as a “prism sheet”) to direct the light toward the viewer. *Id.* ¶ 44; *Abileah* at 28-30, Fig. 2; *Kanda* at 6:11-60, Fig. 6. Exemplary arrangements are shown below, with a light source abutted against one edge of the light guide plate, the reflector sheet below the back

surface of the light guide plate, and diffusion sheets and prism sheets above or coextensive with the front surface of the light guide plate:

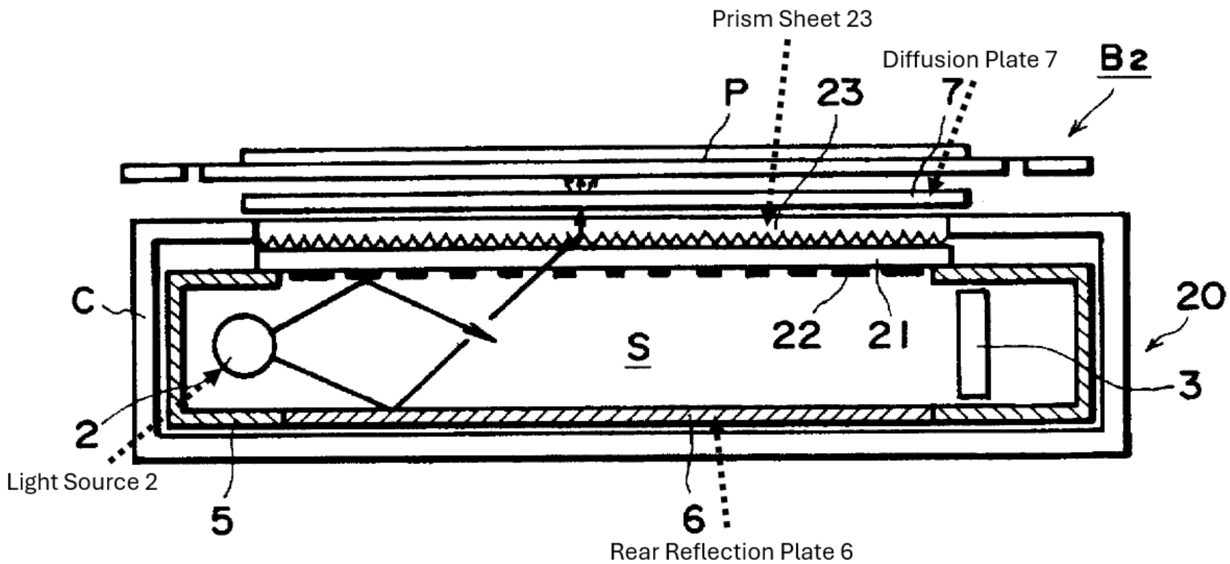
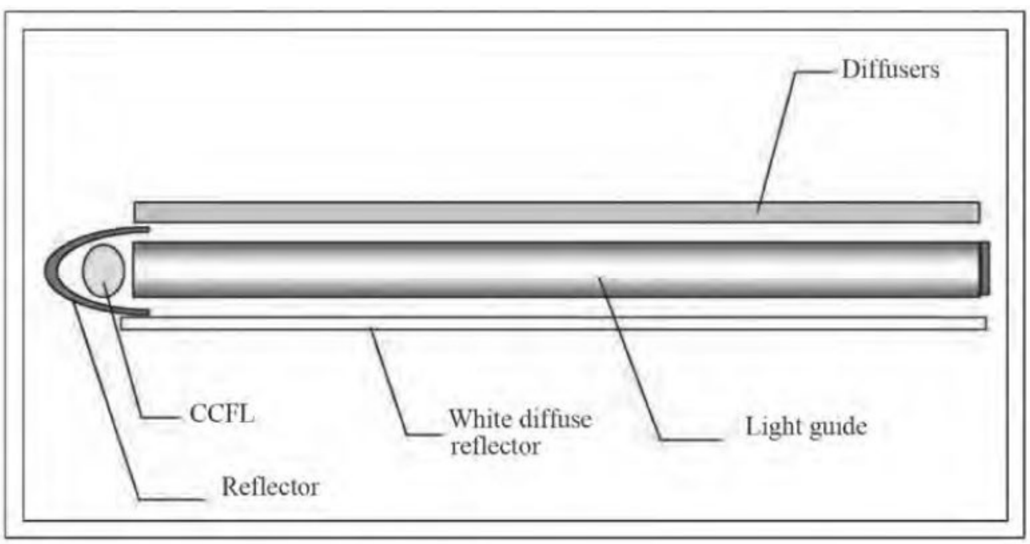


FIG. 6

Kanda at Fig. 6 (annotated).



Abileah at 29, Fig. 2.

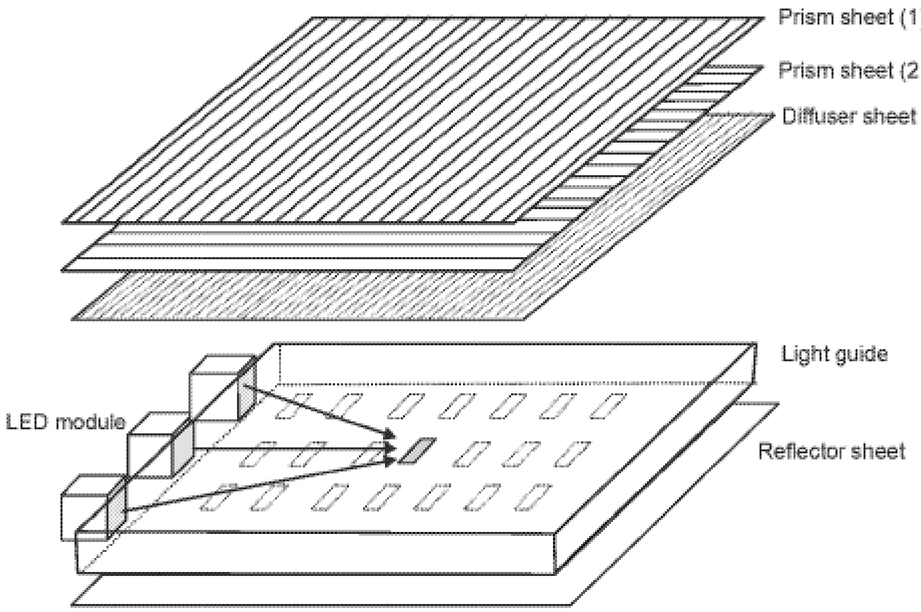


Figure 6.1 Basic structure of an LED backlight unit.

Kobayashi at 74, Fig. 6.1. The edge-lit backlight assembly was well known as of the '135 patent's priority date. Ex. C ¶ 44.

A. Light Guide Plate

An essential component of the edge-lit backlight assembly is the light guide plate. *Id.* ¶ 45. This can alternatively be referred to as a "light guide." *Id.* The light guide plate transfers light from the light source on one edge of the plate across to the entire area of the light guide, and ultimately it directs the light out of the light guide plate toward the LCD (and the viewer). *Id.*

Light guide plates are generally made of solid material with high optical transparency, such as polymethylmethacrylate ("PMMA") or polycarbonate ("PC"). *Id.* ¶ 46; *Mitsuru* at [0025] ("The light guide plate 2A may be a transparent material, and a plate comprising a synthetic resin such as an acrylic resin or polycarbonate resin, or a glass plate, etc.[,] is used, and among these, an acrylic plate is preferred from the point of view of transparency and ease of processing, etc.").

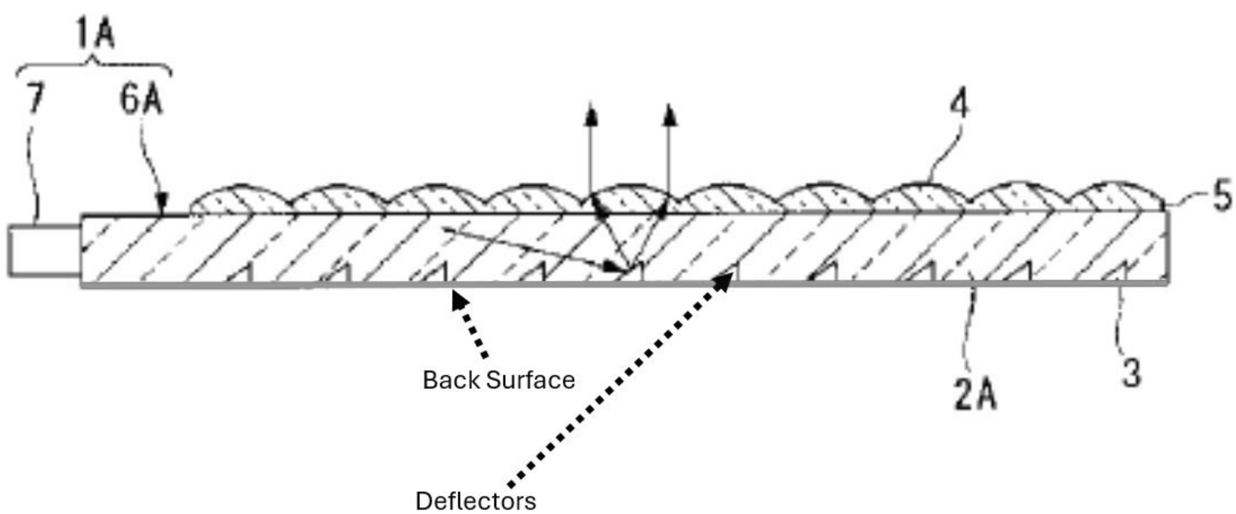
A planar-shaped plate is typically used for applications that require higher luminosity, like computer monitors. Ex. C ¶ 46.

Light emitted from the light source enters the light guide from the edge and propagates along the length of the light guide via "total internal reflection." *Id.* ¶ 47; *Mitsuru* at [0003] ("The light which has entered undergoes repeated total reflection within the light guide plate and is propagated . . . ."); *Gandhi* at 7:3-4 ("[T]he light from lamp 112 is distributed throughout the light guide 110 by means of total internal reflection."); *Kobayashi* at 244 ("The light is propagated along the light guide by total internal reflection."). Total internal reflection (also referred to as "TIR") is a phenomenon by which waves arriving at the interface (boundary) from one medium to another (e.g., from the resin of a light guide to air) are not refracted into the second medium, but completely reflected back into the first medium (i.e., propagated within the light guide). Ex. C ¶ 47. Total internal reflection occurs when the second medium has a lower refractive index than the first, and the waves are incident at a sufficiently oblique angle on the interface between the two mediums. *Id.*; *Gandhi* at 14:35-38 ("Total internal reflection occurs with 100% reflective efficiency when light is incident on a dielectric interface with angles above a critical angle.").

B. Light-Deflecting Features on the Bottom Surface of the Light Guide Plate

Light guide plates utilize total internal reflection to distribute the light along the length of the light guide plate, but this can also trap light within the light guide plate, creating challenges with extracting the light towards the LCD panel. Ex. C ¶ 48; *Abileah* at 30 ("Once the light is uniformly and efficiently delivered onto the edge of the light guide [plate], the problem remains to effectively extract the light from the light guide uniformly in two dimensions."); *Kobayashi* at 66-67 ("Light incident on the light-guide plate cannot emerge from the plate due to the total internal reflection."). To aid in light extraction, light guide plates typically incorporate deflecting

features on the bottom surface. Ex. C ¶ 48; *Mitsuru* at [0023] (disclosing "a light guide plate 2A in which a plurality of prismatic reflection grooves 3 are provided on a back surface 20 side, the reflection grooves 3 reflecting, to a front surface side, light that entered from a side surface side and propagated"); *Gandhi* at 2:26-30 ("The geometric light redirectors are also referred to herein as extraction centers, extraction structures, and deflectors. The light redirectors' function is to extract light out of the light guide and toward the viewer. In one embodiment, the light redirectors are prismatic in shape."). These features deflect light, due to reflection and/or refraction, at angles so that they can exit the guide and are no longer confined within the light guide. Ex. C ¶ 48. Exemplary deflectors are shown below on the back surface of a light guide:



Mitsuru at Fig. 1 (annotated).

The light guide plate's bottom (or back) surface contains both deflecting features and smooth regions (between the deflectors and between the deflectors and edge of the light guide plate). Ex. C ¶ 49. The smooth portions of the surface are necessary for total internal reflection within the light guide plate, and the deflecting features aid in light emission and increase brightness. *Id.* The pattern and density of the features influence the uniformity of the emitted light.

Id.; *Mitsuru* at [0050] ("The density of the reflection grooves 13 was increased further away from the light source 7 so that the average brightness was uniform."); *Gandhi* at 8:58-63 ("[T]he deflectors are placed or distributed in a controlled fashion along the light guide, in some cases with a lower density of deflectors 205 near to the lamp source and a higher density of deflectors further from the lamp."), 21:13-18 ("The deflectors 1030 are arranged with unequal spacing in the light guide 1005. The closer spacing at distances further from the injector 1006 helps to ensure the uniformity of the emitted light."). For example, the density of features can be designed to increase further away from the light source. Ex. C ¶ 49. This is because there is more light closer to the light source and thus fewer deflecting features are needed to extract enough light out for a suitable brightness. *Id.* Ultimately the goal is to achieve uniformity of light exiting the light guide plate. *Id.*

C. Lens Features on the Front Surface of the Light Guide Plate

To aid in light extraction and to help orient the direction of the emitted lights towards the LCD display, light guide plates also employ lens features (also, "prism" features) on the front (i.e., top) surface of the light guide. *Id.* ¶ 50; *Kanda* at 6:58-64; *Kobayashi* at 68-70. The lens pattern can be formed by cutting linear lens patterns into the light guide plate using a bit, resulting in the pattern being reflected in the molded light guide plate. Ex. C ¶ 50; *Mitsuru* at [0037] ("The sheet 5 comprising the lenses 4 arranged alongside each other, and the light guide plate 2A may be separately molded and stacked for use, or they may be integrally molded."); *Gandhi* at 25:11-14 ("[T]he prism sheet 1210 is not provided as a separate component, but rather the prisms['] shapes are molded into and form an integral part of the top surface of the light guide 1204."); *Kobayashi* at 69-70, Fig. 5.4.

The specific shape of the lens or prism can vary, and many take the form of linear cylindrical lenses. Ex. C ¶ 51. *Mitsuru*, for example, describes microlenses or cylindrical lenses

arranged alongside each other. *Mitsuru* at [0007] ("a sheet which is arranged on the front surface side of the light guide plate and comprises microlenses or cylindrical lenses arranged alongside each other"), [0012], [0032], Fig. 1. This arrangement collimates the light rays (i.e., makes the rays parallel, often in the direction of the viewer).

D. Optical Film Components Such as Reflective Sheets and Diffusion Sheets

Other optical film components of backlights, such as reflective sheets and diffusion sheets, were also well known and well understood as of the earliest priority date of the '135 patent. Ex. C ¶ 53; *Abileah* at 28-33; *Kobayashi* at 63, 74-76, Table 5.1, Fig. 6.1.

Reflective sheets on a light guide's back surface were known to maximize light usage. Ex. C ¶ 54. These sheets recycle light that is emitted into a light guide plate in a non-useful direction (e.g., in a direction that will not result in the light being reflected toward the viewer) by directing that light back into the light guide so that the light can be utilized. *Id.*; *Abileah* at 29 ("The light reflected by the rear reflector includes not only the original emission from the lamps, but also any light that is reflected back into the cavity from higher surfaces. If that light is not reflected, it will be lost, thus affecting efficiency. Therefore, in many cases, the rear reflector also serves as a recycling function as well."); *Kobayashi* at 81-82 ("The reflector sheet is disposed at the lower surface of the light guide (Figure 6.1) and has the function of reflecting light that has escaped from the light guide back to the light guide again."), 245, Fig. 6.1. The reflective sheet is positioned below the light guide to reflect light emitted from the backside of the light guide. Ex. C ¶ 55; *Abileah* at 30 ("A white reflector is usually placed behind the light guide to direct the light forward. This can be a similar film material as mentioned above (*e.g.*, ESR film from 3M) or paint on the bottom of the housing."); *Kunimochi* at 1:5-10, 5:45-67 ("A light reflecting sheet 32 is disposed at

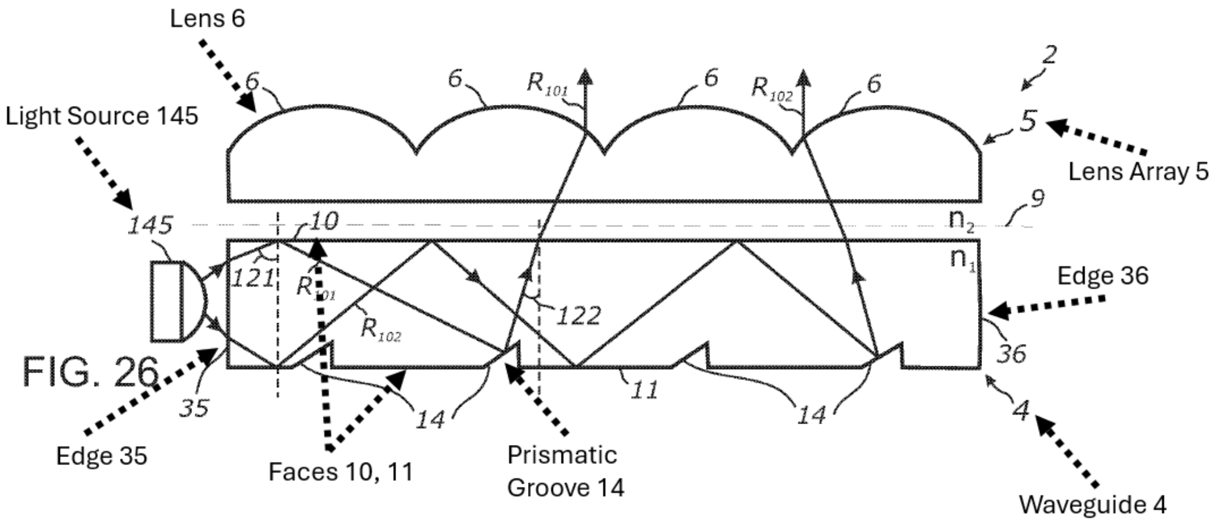
one major surface, specifically a bottom surface (light reflecting surface) 2c of the light guide plate 2."), Fig. 1.

Diffusion sheet(s) positioned above the light guide (or coextensive with the front surface) "randomize any spatial coherence in the light and make it as two-dimensionally uniform as possible." *Abileah* at 30. As Mr. Flasck explains, deflection features on the bottom surface of the light guide plate are necessary to deflect light toward the viewer (as discussed above), but the pattern of these features can create bright spots and dark spots. Ex. C ¶ 56. Diffusion sheets provide an intermediate layer to ensure that the light does not include these visible patterns. *Id.*; *Gandhi* at 25:3-6 ("In some embodiments[,] a diffusing film is inserted between the light guide 1204 and the prism film 1210. The diffusing film helps to remove visual artifacts produced by a regular array of deflectors 1206."). Diffusion sheets receive light from a range of angles and re-direct it, typically over a wide range of angles to generate a new uniform luminous area. Ex. C ¶ 56. Such sheets were well known as of the priority date of the '135 patent. Ex. C ¶ 57; *Mitsuru* at [0049]; *Abileah* at 30; *Kobayashi* at 244-245, Fig. 19.6.

IV. OVERVIEW OF THE '135 PATENT AND ITS PROSECUTION HISTORY

A. Specification

The '135 patent's disclosure "relates to a device intercepting the divergent light from a light source and directing the light into a collimated beam such as flashlights, spotlights, flood lights, LED collimators, lanterns, headlamps, backlight or projection display systems, accent lights, various other illumination devices, optical couplers and switches, and the like." '135 patent at 4:17-23. In particular, the '135 patent discloses "[a]n apparatus for distributing light from a planar waveguide through an array of linear cylindrical lenses formed in a major surface of the waveguide." *Id.* at Abstract. An exemplary apparatus is shown below:



Id. at Fig. 26 (annotated), 34:44-67, 38:52-40:48.

According to the ’135 patent, “[l]ight received on an edge of the waveguide is propagated” through a waveguide and retained within the waveguide “by total internal reflection.” *Id.* at Abstract. The waveguide includes “light deflecting elements” along the back surface of the waveguide, and these deflecting elements “redirect the light to escape the waveguide such that the [light] extracted from the waveguide is further redirected and redistributed through the array of linear cylindrical lenses.” *Id.*

B. Claims 1 and 16 of the ’135 Patent

This Request concerns independent claim 1 and dependent claim 16, which depends from independent claim 1. Both claims are reproduced below:

> 1. An edge-lit waveguide illumination system, comprising:
>
> an optically transmissive plate having a flexible monolithic structure, a front surface, an opposing back surface extending parallel to the front surface, a first edge, a second edge extending parallel to the first edge, a third edge extending perpendicular to the first and second edges, and a fourth edge extending parallel to the third edge, wherein a distance between the first and second edges is at least 40

times greater than a thickness of the optically transmissive plate and a distance between the third and fourth edges is at least 20 times greater than the thickness of the optically transmissive plate;

a plurality of light emitting diodes optically coupled to the first edge and configured to emit a divergent light beam towards the first edge;

a lenticular array of linear cylindrical lenses formed in the front surface and extending along straight parallel lines between two opposing edges of the optically transmissive plate;

a plurality of discrete light extracting surface relief features formed in the back surface according to a two-dimensional pattern such that individual ones of the plurality of the discrete light extracting surface relief features are separated from one another and from each of the first, second, third, and fourth edges by smooth and planar portions of the back surface;

a reflective surface approximately coextensive with the optically transmissive plate and positioned on a back side of the optically transmissive plate; and

a light diffusing layer approximately coextensive with the optically transmissive plate,

wherein the optically transmissive plate is configured to receive light on the first edge, guide the light received on the first edge towards the second edge using optical transmission and total internal reflection, and distribute the light received on the first edge from both the front and back surfaces towards divergent directions,

wherein the optically transmissive plate is further configured to receive light on the front surface and propagate the light received on the front surface towards the back surface,

wherein an area occupied by each of the linear cylindrical lenses is substantially greater than an area occupied by each of the plurality of the discrete light extracting surface relief features, and

wherein at least one of the plurality of discrete light extracting surface relief features is configured to disrupt total internal reflection at the back surface and extract at least some light

> propagated in the optically transmissive plate towards the reflective surface.
>
> 16. An edge-lit waveguide illumination system as recited in claim 1, wherein a focal length characterizing at least one of the linear cylindrical lenses is less than a distance between the lenticular array and the plurality of discrete light extracting surface relief features.

Id. at 57:37-58:22, 59:22-26.

C. Prosecution History

The ’135 patent was filed on December 20, 2019, as U.S. Application No. 16/723,867. *Id.* at Cover Page, (21), (22). On October 5, 2020, the Examiner allowed all claims without once rejecting the claims in view of the prior art of record. Ex. B at 170-180.

D. Level of Ordinary Skill in the Art

A person of ordinary skill in the art (“POSITA”) at the time the application leading to the ’135 patent was filed would have had at least an equivalent of a bachelor’s degree from an accredited institution in physics, electrical engineering, or optics, as well as at least three years of academic, research, or industry experience in the field of optical devices. Ex. C ¶ 24. Significant experience could substitute for formal education, and significant education could substitute for work experience. *Id.*

During the parallel litigation, Patent Owner’s technical expert opined that a “POSITA would have a bachelor’s degree in electrical engineering, physics, or optics and at least three years of relevant industry, research, or other experience related to optical devices and light sources used in LCD backlights or general illumination (‘Relevant Experience’); or a general science degree and five or more years of such Relevant Experience.” Credelle Rpt. ¶ 265. The analysis in this Request for *ex parte* reexamination would not change under Patent Owner’s definition of the level of ordinary skill in the art. Indeed, to the extent Patent Owner requires a higher level of skill (e.g.,

"five or more years of such Relevant Experience"), it is even more likely that one of ordinary skill in the art would have found the claims to be obvious. *See Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1366 (Fed. Cir. 2012) ("[I]t is generally easier to establish obviousness under a higher level of ordinary skill in the art.").

E. Claim Construction for the '135 Patent

During a related litigation in the Western District of Texas, SVV and Acer argued as to how several claim terms should be construed. *See* L-2; L-3. The disputed term "substantially" appears in claims 1 and 16 of the '135 patent, and the parties' proposed constructions and the district court's final construction of this term are provided in the following table:

Claim Term	Acer's Construction	SVV's Construction	District Court's Construction
"substantially" Claim 1	Indefinite. L-2 at 5.	Plain and ordinary meaning. *Id.*	Plain and ordinary meaning. L-3 at 4.

Additionally, Acer and SVV agreed to the following constructions during claim construction:

Claim Term	Agreed Construction
"TIR" or "total internal reflection" Claim 1	"the phenomenon that involves the reflection of all the incident light off the boundary between a first medium and a second medium of lower refractive index, when the angle of incidence to the second medium exceeds the critical angle." L-2 at 5; L-3 at 4.
"optically coupled" Claim 1	"providing for transfer of light from one optical component to another." L-2 at 5; L-3 at 4.

This Request applies the agreed constructions and the district court's final constructions.

V. IDENTIFICATION OF PRIOR ART AND SUBSTANTIAL NEW QUESTIONS OF PATENTABILITY

A. Identification of Prior Art

The earliest possible priority date for claims 1 and 16 of the '135 patent is April 21, 2009. '135 patent at Cover Page, (60). Reexamination is requested in view of the following prior art references:

PA-1: Japanese Unexamined Patent Application Publication No. JP 2006-114239 to Mitsuru Kamikatano et al., published April 27, 2006, including certified translation ("*Mitsuru*").

PA-2: U.S. Patent No. 7,876,489 to Jignesh Gandhi et al., filed September 26, 2006 ("*Gandhi*").

As explained in detail in Section VII, the proposed grounds of rejection are based on (1) *Mitsuru* and (2) *Mitsuru* in view of *Gandhi*.

These prior art documents are listed on a form PTO/SB/08 filed concurrently herewith. Copies of all the listed references are attached.

B. Substantial New Questions of Patentability

As an initial matter, Requester notes that the litigation does not impact whether this Request raises an SNQ. According to the M.P.E.P., an SNQ can be raised if it has not been "(A) decided in a final holding of *invalidity* by a federal court in a decision on the merits involving the claim, after all appeals; (B) decided in an earlier concluded examination or review of the patent by the Office; or (C) raised to or by the Office in a pending reexamination or supplemental examination of the patent." M.P.E.P. § 2242 (emphasis added). No final judgment has been entered, much less appealed, in *SVV Technology Innovations Inc. v. Acer Inc.*, No. 6:22-cv-00640-ADA (W.D. Tex.). Therefore, the litigation does not impact the SNQ analysis here.

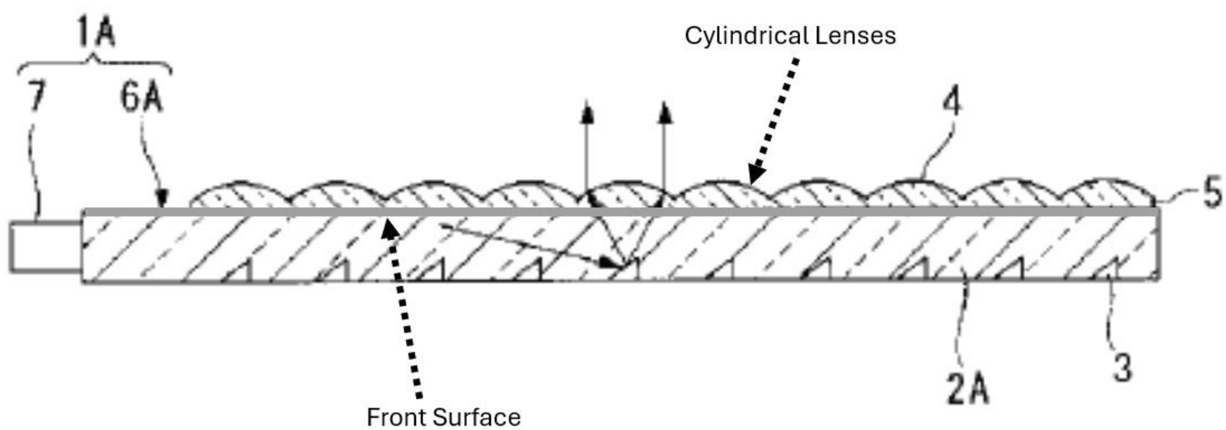
1. *Mitsuru* Raises an SNQ with Respect to Claims 1 and 16

Claims 1 and 16 of the '135 patent are directed to "[a]n edge-lit waveguide illumination system." '135 patent at 57:37-38. The claimed system includes, in part, "an optically transmissive plate having . . . a front surface," "a lenticular array of linear cylindrical lenses formed in the front surface," and "a plurality of discrete light extracting surface relief features formed in the back surface according to a two-dimensional pattern." *Id.* at 57:39-64.

During prosecution, the Examiner found that the prior art lacked these features because the prior art combination "would only suggest a plurality of surface relief features formed in a broad-area surface as *linear* grooves, i.e., according to a predetermined *one-dimensional* pattern." Ex. B at 178. The Examiner explained that, while one reference "uses surface relief features 1103 formed in a broad-area surface as according to a predetermined *two-dimensional* pattern, the surface relief features 1103 are used in conjunction with another plurality of surface relief features 1104 formed in the opposite broad-area surface, not in conjunction with a plurality of linear cylindrical lenses as recited by the claims." *Id.* The Examiner further noted that other prior art of record also failed to disclose "a lenticular array of linear cylindrical lenses," as claimed. *Id.* at 178-179. But these claimed concepts were known before the earliest claimed priority date of the '135 patent, as demonstrated by *Mitsuru*.

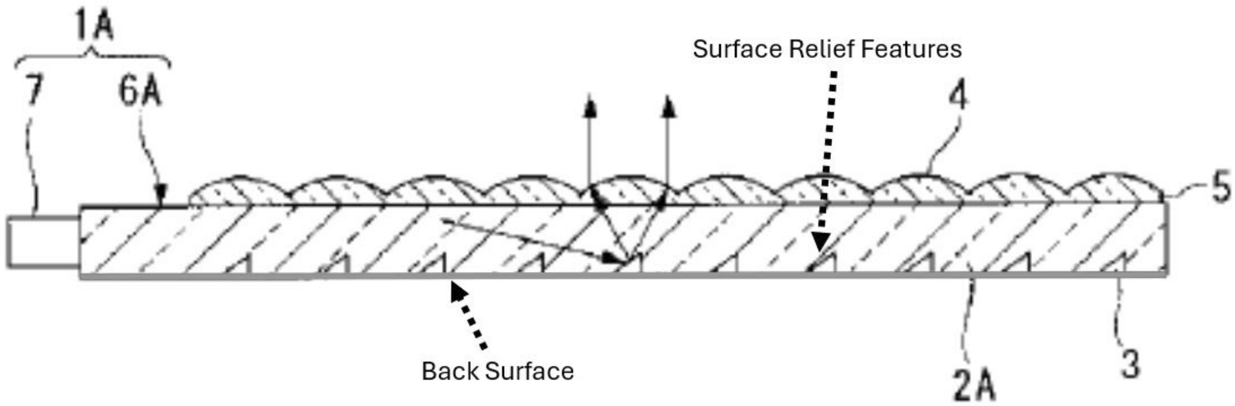
Mitsuru discloses "a planar light-source light guide" for use in, among other things, "a liquid crystal display device." *Mitsuru* at [0001]. *Mitsuru* explains that in a prior art backlight for "an edge-lit liquid crystal display device, light from a light source such as a cold-cathode tube or a light-emitting diode . . . enters from a side surface (end surface) of a light guide known as a light guide plate employing a transparent resin." *Id.* at [0003].

To improve on prior art devices, *Mitsuru* discloses "a planar light-source light guide characterized by being provided with: a light guide plate in which ***prismatic reflection grooves are arranged on a back surface side*** and/or internally, the reflection grooves reflecting, to a front surface side, light that entered from a side surface side and propagated; and a sheet which is arranged on the front surface side of the light guide plate and comprises microlenses or ***cylindrical lenses arranged alongside each other corresponding to each of the reflection grooves***." *Id.* at [0007] (emphases added). *Mitsuru*'s exemplary planar light-source light guide is shown below, including cylindrical lenses 4 formed on the front surface of the light guide:



Id. at Fig. 1 (annotated).

Mitsuru discloses that the prismatic reflection grooves, which are surface relief features used to disrupt total internal reflection, are arranged according to a predetermined two-dimensional pattern. These grooves are shown below:



Id. at Fig. 1 (annotated), [0023]. *Mitsuru* teaches that these reflection grooves can be "formed at an average density of 25 grooves/mm^2 on one surface (bottom surface)." *Id.* at [0046]. *Mitsuru* further discloses, with respect to the pattern, that "[t]he density of the reflection grooves 13 was increased further away from the light source 7 so that the average brightness was uniform." *Id.* at [0050]. This is a two-dimensional pattern.

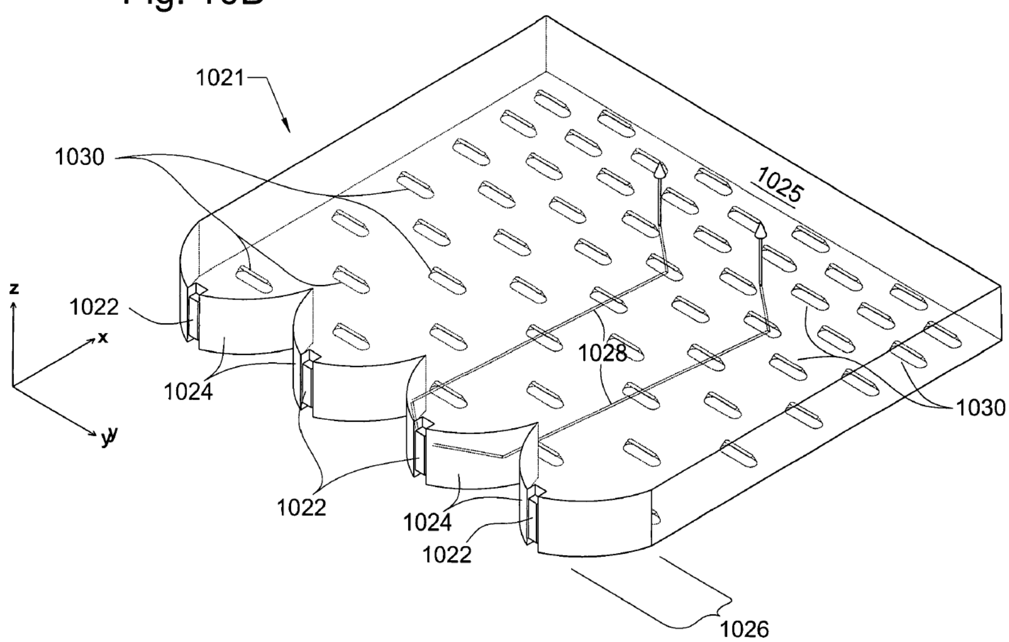
Mitsuru's teachings were not previously considered or addressed during the prosecution of the application resulting in the '135 patent. *Mitsuru* was also not cited on any information disclosure statement or considered by the Examiner at any point during prosecution. *See* '135 patent at Cover Page, at p. 2, (56). Because *Mitsuru* teaches the claim features the Examiner thought were missing from the prior art, and the Examiner did not consider *Mitsuru*, it raises an SNQ for the patentability of claims 1 and 16.

2. The Combined Teachings of *Mitsuru* and *Gandhi* Raise an SNQ with Respect to Claims 1 and 16

As stated in Section V.B.1, the teachings of *Mitsuru* raise an SNQ with respect to claims 1 and 16. As further discussed, *Mitsuru*, unlike the prior art of record during prosecution, teaches "a plurality of discrete light extracting surface relief features formed in the back surface according to a two-dimensional pattern." '135 patent at 57:58-64. *Gandhi* also provides additional detailed

disclosures regarding the use of two-dimensional patterns of light-deflecting elements that would have further rendered obvious claims 1 and 16. *Gandhi* teaches specific deflector (i.e., extraction structure or reflection groove) patterns "to ensure uniformity of the output." *Gandhi* at 8:58-63. *Gandhi* teaches that "the deflectors are placed or distributed in a controlled fashion along the light guide, in some cases with a lower density of deflectors 205 near to the lamp source and a higher density of deflectors further from the lamp." *Id.* One exemplary pattern is shown below:

Fig. 10B



Id. at Fig. 10B. Therefore, because *Gandhi* provides additional teachings beyond those that already provide an SNQ and, in combination with *Mitsuru*, further teach claim features the Examiner through were missing from the prior art, the teachings of *Mitsuru* and *Gandhi* raise an SNQ for the patentability of claims 1 and 16.

VI. PROPOSED REJECTIONS OF THE '135 PATENT

The following rejections are proposed in this Request for claims 1 and 16 of the '135 patent:

- Claims 1 and 16 are unpatentable under 35 U.S.C. § 103 as being obvious over *Mitsuru*.
- Claims 1 and 16 are unpatentable under 35 U.S.C. § 103 as being obvious over *Mitsuru* in view of *Gandhi*.

VII. DETAILED EXPLANATION OF THE PROPOSED REJECTIONS OF THE CLAIMS OF THE ’135 PATENT

A. *Mitsuru* Renders Obvious Claims 1 and 16

As explained below, *Mitsuru* renders obvious independent claim 1 and dependent claim 16.

1. Overview of *Mitsuru*

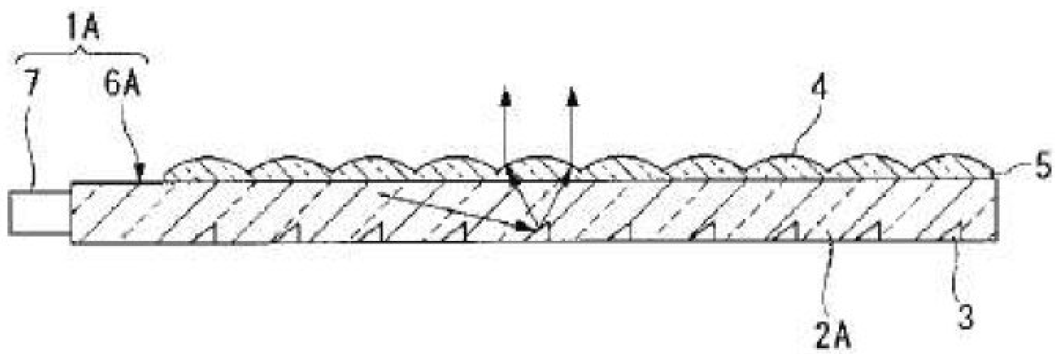
Mitsuru, like the ’135 patent, discloses “a planar light-source light guide” for use in, among other things, “a liquid crystal display device.” *Mitsuru* at [0001]; Ex. C ¶¶ 64-68.

Mitsuru explains that in a prior art backlight for “an edge-lit liquid crystal display device, light from a light source such as a cold-cathode tube or a light-emitting diode . . . enters from a side surface (end surface) of a light guide known as a light guide plate employing a transparent resin.” *Id.* at [0003]. “The light which has entered undergoes repeated total reflection within the light guide plate and is propagated, but because a front surface or a back surface of the light guide plate is subjected to processing such as sandblasting, or microgroove or dot printing, etc.[,] processing, propagation of the light that has reached the processed parts varies so as to deviate from total reflection conditions, and the light leaks to an outer surface of the light guide plate.” *Id.* According to *Mitsuru*, “[t]he light which has leaked forms a planar light source which functions as a backlight.” *Id.* at [0004].

Mitsuru, however, discloses that the prior art device has limitations, including low directionality and a thick (rather than thin) planar light source. *Id.* at [0006]. To improve on prior art devices, *Mitsuru* discloses “a planar light-source light guide characterized by being provided

with: a light guide plate in which prismatic reflection grooves are arranged on a back surface side and/or internally, the reflection grooves reflecting, to a front surface side, light that entered from a side surface side and propagated; and a sheet which is arranged on the front surface side of the light guide plate and comprises microlenses or cylindrical lenses arranged alongside each other corresponding to each of the reflection grooves." *Id.* at [0007].

An exemplary planar light-source light guide, as disclosed by *Mitsuru*, is shown below:



Id. at Fig. 1. *Mitsuru* discloses that, "[f]or applications where flexibility is required, the thickness of the light guide plate 2A is preferably in a range of 0.05 mm-3 mm." *Id.* at [0031]. According to *Mitsuru*, "sheet 5 comprising the lenses 4" may be a "synthetic resin such as an acrylic resin," *id.* at [0025], and "the size of the reflection grooves 3 is preferably in a height range of 1 µm-50 µm," *id.* at [0034].

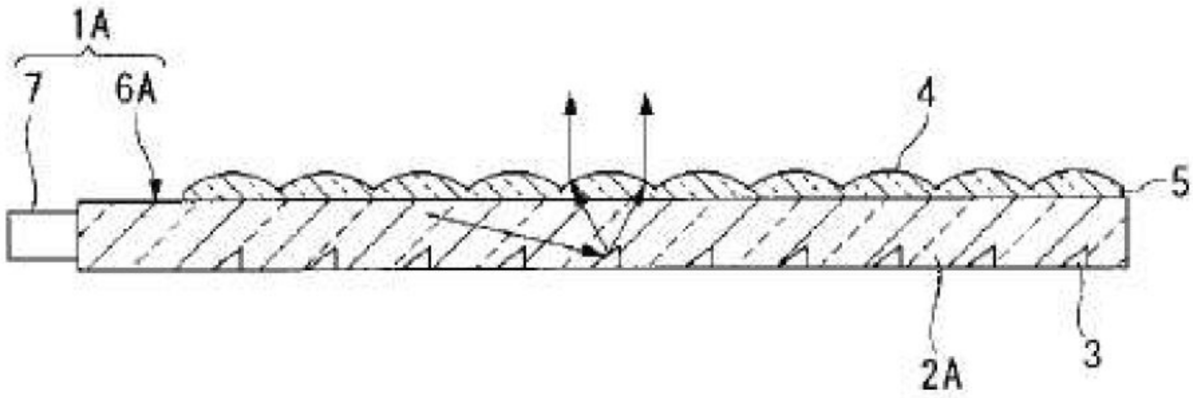
Mitsuru discloses different planar light-source light guide embodiments, but as Dr. Flasck explains, one of ordinary skill would have understood that the different embodiments can be read together as part of a single disclosure. Ex. C ¶ 68. For example, *Mitsuru* does not disclose certain dimensions or other implementation details for the light guide plate in Figure 1, but one of ordinary skill seeking to implement the light guide plate in Figure 1 would have found it obvious to look to the dimensions and implementation details disclosed by *Mitsuru* in specific, more detailed actual

implementations. *Id.* This includes Figure 3, which is described as "Example 1." *Mitsuru* at [0046]. In this example, *Mitsuru* discloses the light guide plate has "a length and breadth of 100 mm" and "thickness of 1.1 mm." *Mitsuru* at [0046], [0047]; *see also id.* at [0024] (disclosing similar dimensions). *Mitsuru* also discloses that "microlenses 4" have "a radius of curvature R = 200 µm." *Id.* at [0047]. And *Mitsuru* further discloses that reflection grooves can be "formed at an average density of 25 grooves/mm^2 on one surface (bottom surface)." *Id.* at [0046]. Although there are differences in the embodiments disclosed in Figure 1 and Figure 3, one of ordinary skill would not view those differences as an obstacle for further understanding how to implement the embodiment disclosed in Figure 1. Indeed, many of the implementation details disclosed in Figure 3 (i.e., "Example 1") are consistent with how light guide plates were conventionally designed prior to the priority date of the '135 patent. *See* Section III.

2. Claim 1

a. [1Pre]: "An edge-lit waveguide illumination system, comprising:"

Mitsuru discloses "[a]n edge-lit waveguide illumination system." Ex. C ¶ 69. *Mitsuru* discloses "planar light sources" for use "as backlights for" "edge-lit liquid crystal display device[s]." *Mitsuru* at [0002]-[0003]. In particular, *Mitsuru* discloses "a planar light-source light guide which has high directionality and can be made thin with a simple structure." *Id.* at [0006]. *Mitsuru*'s Figure 1 illustrates one embodiment of the light guide, "where the reference symbol 1A in the drawing is a planar light source, 2A is a light guide plate, 3 is a reflection groove, 4 is a microlens or cylindrical lens . . . , 5 is a sheet, 6A is a planar light-source light guide, and 7 is a light source":



Id. at Fig. 1, [0022]. One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "[a]n edge-lit waveguide illumination system." Ex. C ¶ 69.

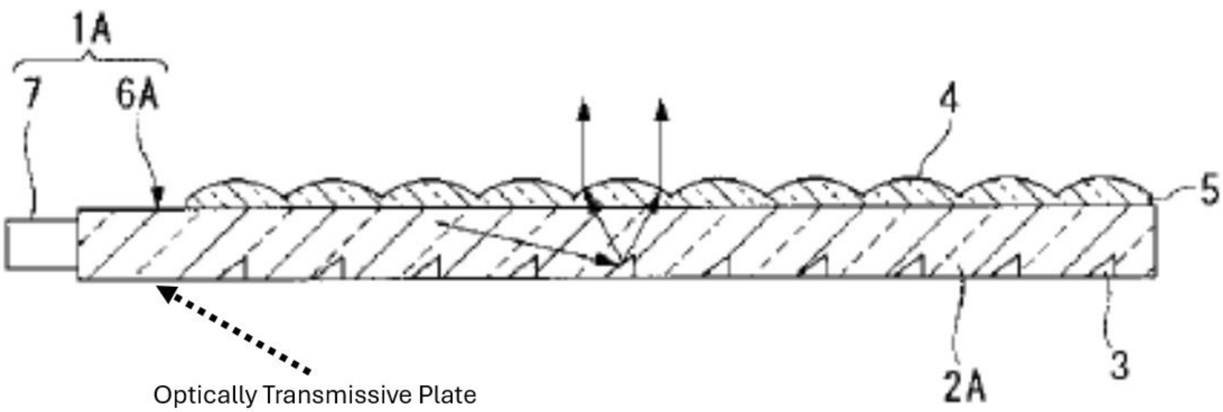
b. [1A]: "an optically transmissive plate having a flexible monolithic structure,"

Mitsuru discloses "an optically transmissive plate having a flexible monolithic structure." *Id.* ¶¶ 70-72. *Mitsuru*'s light guide plate 2A is an optically transmissive plate, as claimed. *Mitsuru* discloses that "light . . . enters [the plate] from a side surface (end surface)" and "undergoes repeated total reflection within the light guide plate and is propagated [through the plate]." *Mitsuru* at [0003]. To ensure the plate is optically transmissive (i.e., light can propagate), *Mitsuru* discloses that "light guide plate 2A may be a transparent material." *Id.* at [0025]. For example, the plate may be "a synthetic resin such as an acrylic resin or polycarbonate resin, or a glass plate." *Id.*

Mitsuru's light guide plate 2A is "flexible," as claimed. For example, *Mitsuru* discloses that "[f]or applications where flexibility is required, the thickness of the light guide plate 2A is preferably in a range of 0.05 mm-3 mm." *Id.* at [0031]; *see also id.* at [0040].

Mitsuru's light guide plate 2A has a "monolithic structure," as claimed. *Mitsuru* discloses that the plate is made from a single "transparent material, . . . such as an acrylic resin or

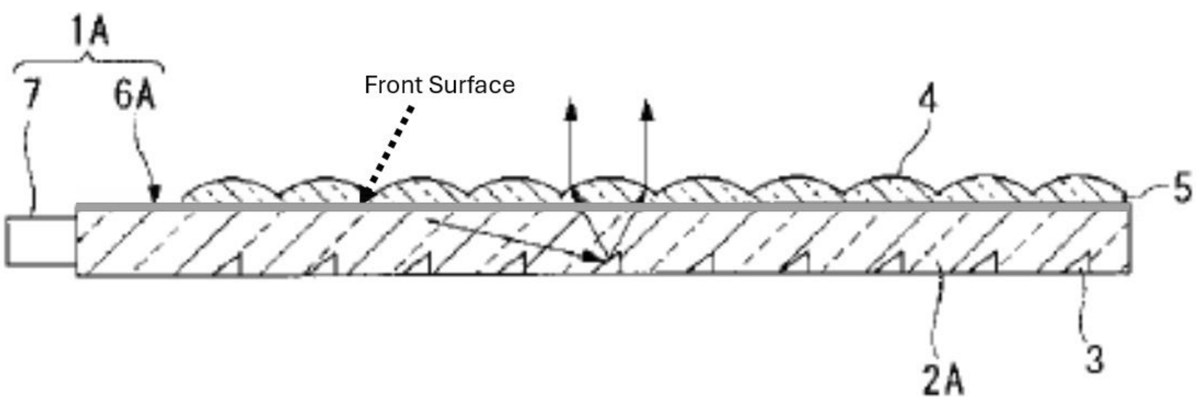
polycarbonate resin, or a glass plate." *Id.* at [0025]. This is consistent with *Mitsuru*'s figures, which likewise illustrate light guide plate 2A as a single, monolithic structure:



Id. at Fig. 1 (annotated). One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "an optically transmissive plate having a flexible monolithic structure." Ex. C ¶¶ 70-72.

c. [1B]: "a front surface,"

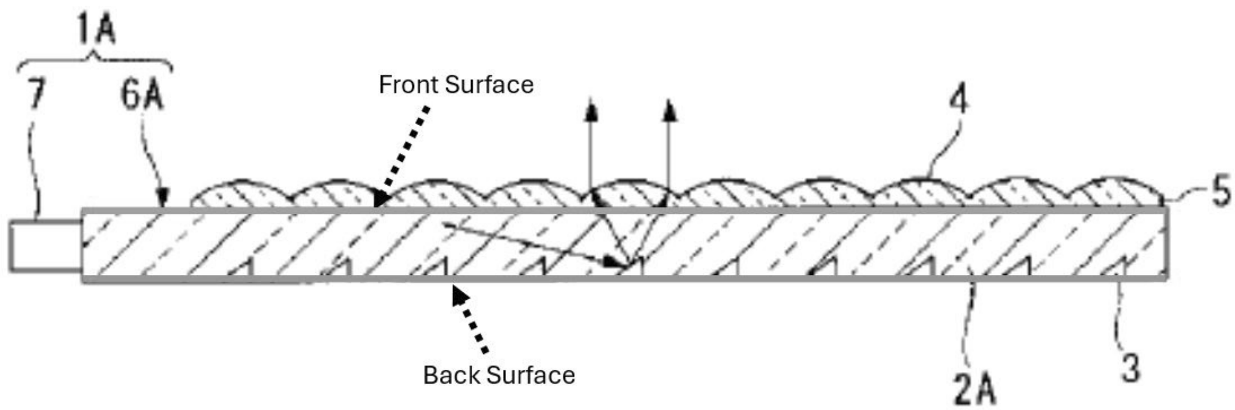
Mitsuru discloses "a front surface." *Id.* ¶ 73. *Mitsuru*'s light guide plate 2A includes a front surface, annotated below:



Mitsuru at Fig. 1 (annotated) *see also, e.g.*, *id.* at [0021] (describing a "front surface"). One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "a front surface." Ex. C ¶ 73.

d. [1C]: "an opposing back surface extending parallel to the front surface,"

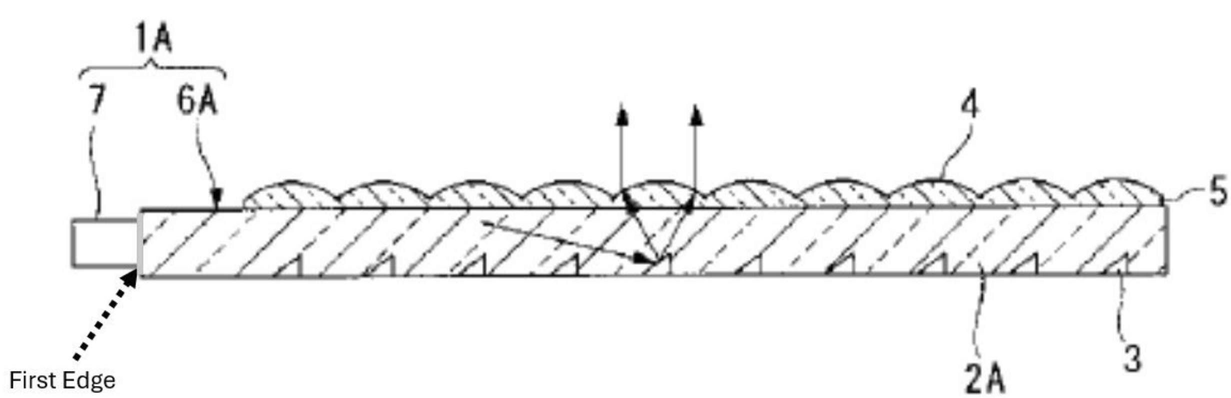
Mitsuru discloses "an opposing back surface extending parallel to the front surface." *Id.* ¶ 74. *Mitsuru*'s light guide plate 2A also includes an opposing back surface extending parallel to the front surface:



Mitsuru at Fig. 1 (annotated); *see also, e.g.*, *id.* at [0021] (describing a "back surface"). One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "an opposing back surface extending parallel to the front surface." Ex. C ¶ 74.

e. [1D]: "a first edge,"

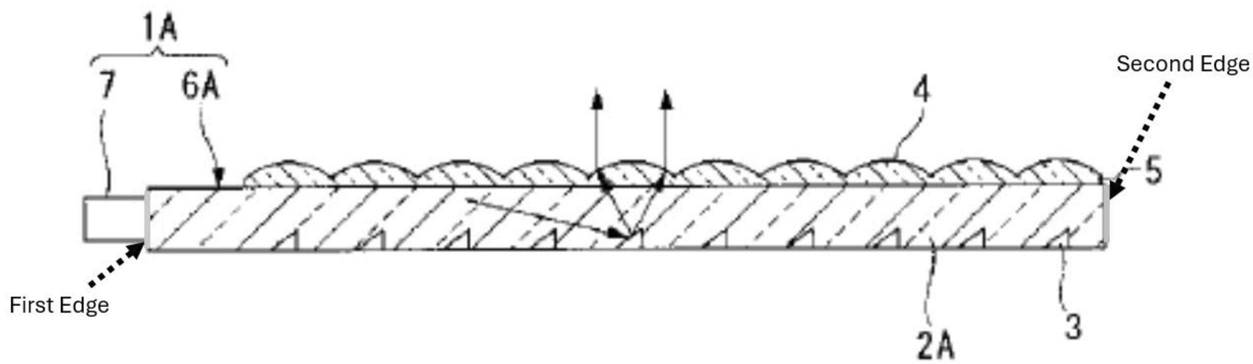
Mitsuru discloses "a first edge." *Id.* ¶ 75. *Mitsuru*'s light guide plate 2A also includes a first edge:



Mitsuru at Fig. 1 (annotated); *see also, e.g.*, *id.* at [0021] (describing a "side surface"). One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "a first edge." Ex. C ¶ 75.

f. [1E]: "a second edge extending parallel to the first edge,"

Mitsuru discloses "a second edge extending parallel to the first edge." *Id.* ¶ 76. *Mitsuru*'s light guide plate 2A also includes a second edge extending parallel to the first edge:

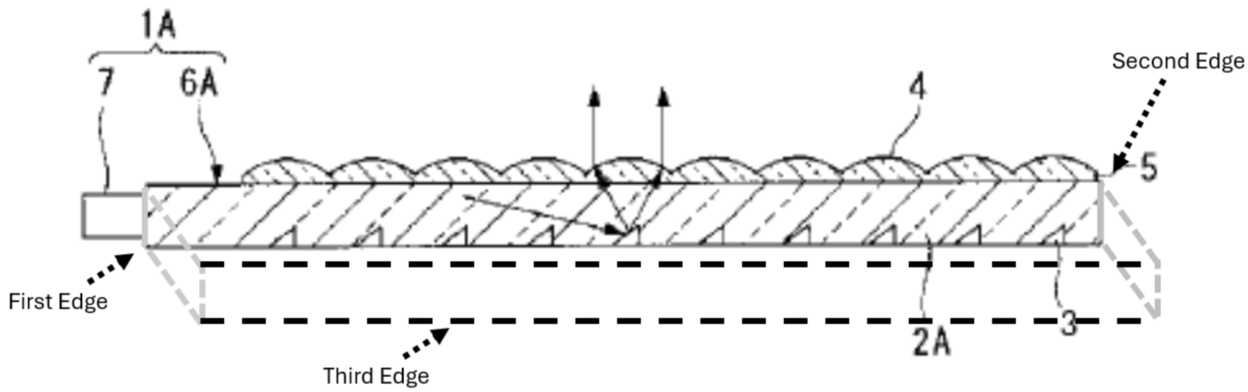


Mitsuru at Fig. 1 (annotated). One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "a second edge extending parallel to the first edge." Ex. C ¶ 76.

g. [1F]: "a third edge extending perpendicular to the first and second edges,"

Mitsuru discloses "a third edge extending perpendicular to the first and second edges." *Id.* ¶¶ 77-79. *Mitsuru*'s light guide plate 2A is three-dimensional, extending both into and out of the field of view. For example, *Mitsuru* discloses that light guide plate 2A may be used for "signboards" or "liquid crystal display devices." *Mitsuru* at [0002]. Indeed, in one example, *Mitsuru* discloses that the light guide plate has "a length and breadth of 100 mm" and "a thickness of 1.1 mm." *Id.* at [0046], [0047]. *Mitsuru* thus discloses that the light guide plate is a three-dimensional shape, such as a rectangular prism.

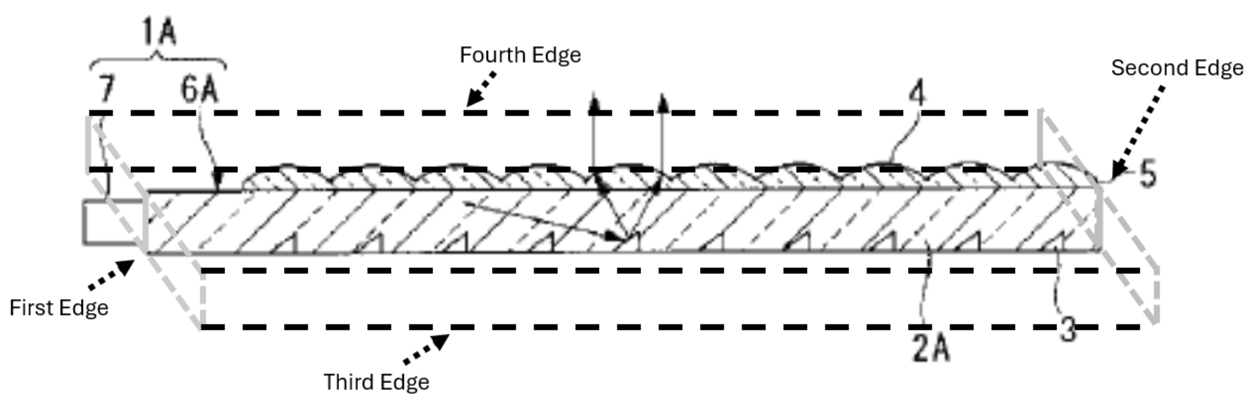
One of ordinary skill would thus have understood that this three-dimensional light guide plate 2A thus includes a third edge, in front of the page and perpendicular to the first and second edges:



Id. at Fig. 1 (annotated), [0022]; Ex. C ¶ 79. One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "a third edge extending perpendicular to the first and second edges." Ex. C ¶¶ 77-79.

h. [1G]: "and a fourth edge extending parallel to the third edge,"

Mitsuru discloses "a fourth edge extending parallel to the third edge." *Id.* ¶ 80. As discussed for [1F], *Mitsuru*'s light guide plate 2A is three-dimensional, extending both into and out of the page. One of ordinary skill would thus have understood that light guide plate 2A includes a fourth edge, behind the page and parallel to the third edge:



Mitsuru at Fig. 1 (annotated), [0022]; Ex. C ¶ 80. One of ordinary skill in the art would thus have understood that *Mitsuru* discloses “a fourth edge extending parallel to the third edge.” Ex. C ¶ 80.

i. [1H]: “wherein a distance between the first and second edges is at least 40 times greater than a thickness of the optically transmissive plate”

Mitsuru discloses or renders obvious “wherein a distance between the first and second edges is at least 40 times greater than a thickness of the optically transmissive plate.” *Id.* ¶¶ 81-84.

As discussed above in Section VII.A.1,[1] one of ordinary skill would have found it obvious to look to the dimensions taught by Example 1. In that example, *Mitsuru* discloses that the light guide plate has “a length and breadth of 100 mm” and “a thickness of 1.1 mm.” *Mitsuru* at [0046], [0047]. Thus, in this example, the distance between the first and second edges is 100 mm. Ex. C ¶ 82. One of ordinary skill in the art would have understood that this is 90 times greater than the 1.1 mm thickness of the optically transmissive plate. *Id.*

In other proceedings, Patent Owner (via an expert report) has argued for this limitation that *Mitsuru* “does not disclose or suggest that this combined structure including lenses and [light guide plate] 2A would meet the [distance] requirement.” Credelle Rpt. ¶ 1376. Patent Owner alleged that “Mitsuru only discloses dimensional [characteristics] of [light guide plate] 2A separately but is silent regarding the dimensions, and particularly thickness, of the combined structure including both [light guide plate] 2A and lenses.” *Id.* The claim, however, refers to the distance “between the first and second edges [of the optically transmissive plate].” Thus, all that is relevant to meeting

[1] As discussed in Section VII.A.1, *Mitsuru* discloses different planar light-source light guide embodiments, but one of ordinary skill in the art would have understood that the different embodiments can be read together as part of a single disclosure. For example, *Mitsuru* does not disclose dimensions or other implementation details for the light guide plate in Figure 1, but one of ordinary skill in the art seeking to implement the light guide plate in Figure 1 would have been motivated to look to the dimensions disclosed by *Mitsuru* in specific implementation examples. Ex. C ¶ 68. This includes Figure 3, which is described as “Example 1.” *Id.*; *Mitsuru* at [0046].

the language of the claim is the dimensions of the light guide plate; the size of the lenses is irrelevant for this limitation.

To the extent the size of the lenses was relevant, *Mitsuru* discloses that "[t]he sheet 5 comprising the lenses 4 arranged alongside each other[] and the light guide plate 2A . . . may be integrally molded." *Mitsuru* at [0037]. In one example, a "plate likewise having a length and breadth of 100 mm and a thickness of 1 mm was thermocompression-bonded to the bottom surface of this [groove] sheet to form the light guide plate 2C having a thickness of 1.1 mm." *Id.* at [0047]. *Mitsuru* further discloses that "[a] square sheet 5 having sides of 100 mm and comprising microlenses 4 with a radius of curvature R = 200 μm and a height of 20 μm arranged alongside each other (the thickness of the sheet including the lens thickness was 50 μm) was further stacked on the sheet on which the reflection grooves 3 were provided." *Id.* One of ordinary skill in the art would have understood that 100 mm is still at least 40 times greater than a plate with a thickness of 1.15 mm. Ex. C ¶ 84. Thus, even if the claim requires determining the thickness of the plate and lenses, *Mitsuru* would still disclose or render obvious this limitation. *Id.*

In addition, the M.P.E.P. makes clear that "where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device." M.P.E.P. § 2144.04.IV.A (citing *Gardner v. TEC Sys., Inc.*, 725 F.2d 1338 (Fed. Cir. 1984) (en banc)). To the extent the only difference between claim 1 and *Mitsuru* is the relative dimensions, claim 1 cannot be patentably distinct. Ex. C ¶ 82 n.7.

One of ordinary skill in the art would thus have understood that *Mitsuru* discloses or renders obvious "wherein a distance between the first and second edges is at least 40 times greater than a thickness of the optically transmissive plate." *Id.* ¶¶ 81-84.

j. [1I]: "and a distance between the third and fourth edges is at least 20 times greater than the thickness of the optically transmissive plate;"

Mitsuru discloses or renders obvious "a distance between the third and fourth edges is at least 20 times greater than the thickness of the optically transmissive plate." *Id.* ¶¶ 85-88.

As discussed above in Section VII.A.1,[2] one of ordinary skill would have found it obvious to look to the dimensions taught by Example 1. In that example, *Mitsuru* discloses that the light guide plate has "a length and breadth of 100 mm" and "a thickness of 1.1 mm." *Mitsuru* at [0046], [0047]. Thus, in this example, the distance between the third and fourth edges is 100 mm. Ex. C ¶ 86. One of ordinary skill would have understood that this is 90 times greater than the 1.1 mm thickness of the optically transmissive plate. *Id*.

In other proceedings, Patent Owner has argued for this limitation that *Mitsuru* "does not disclose or suggest that this combined structure including lenses and [light guide plate] 2A would meet the [distance] requirement." Credelle Rpt. ¶ 1376. Patent Owner alleged that "Mitsuru only discloses dimensional [characteristics] of [light guide plate] 2A separately but is silent regarding the dimensions, and particularly thickness, of the combined structure including both [light guide plate] 2A and lenses." *Id.* The claim, however, refers to the distance "between the third and fourth

[2] As discussed in Section VII.A.1, *Mitsuru* discloses different planar light-source light guide embodiments, but one of ordinary skill in the art would have understood that the different embodiments can be read together, as part of a single disclosure. For example, *Mitsuru* does not disclose dimensions or other implementation details for the light guide plate in Figure 1, but one of ordinary skill in the art seeking to implement the light guide plate in Figure 1 would have been motivated to look to the dimensions disclosed by *Mitsuru* in specific implementation examples. Ex. C ¶ 68. This includes Figure 3, which is described as "Example 1." *Id.*; *Mitsuru* at [0046].

edges [of the optically transmissive plate].” Thus, all that is relevant to meeting the language of the claim is the dimensions of the light guide plate; the size of the lenses is irrelevant for this limitation.

To the extent the size of the lenses was relevant, *Mitsuru* discloses that “[t]he sheet 5 comprising the lenses 4 arranged alongside each other[] and the light guide plate 2A . . . may be integrally molded.” *Mitsuru* at [0037]. In one example, a “plate likewise having a length and breadth of 100 mm and a thickness of 1 mm was thermocompression-bonded to the bottom surface of this [groove] sheet to form the light guide plate 2C having a thickness of 1.1 mm.” *Id.* at [0047]. *Mitsuru* further discloses that “[a] square sheet 5 having sides of 100 mm and comprising microlenses 4 with a radius of curvature R = 200 μm and a height of 20 μm arranged alongside each other (the thickness of the sheet including the lens thickness was 50 μm) was further stacked on the sheet on which the reflection grooves 3 were provided.” *Id.* One of ordinary skill in the art would have understood that 100 mm is still at least 20 times greater than a plate with a thickness of 1.15 mm. Ex. C ¶ 88. Thus, even if the claim requires determining the thickness of the plate and lenses, *Mitsuru* would still disclose or render obvious this limitation. *Id.*

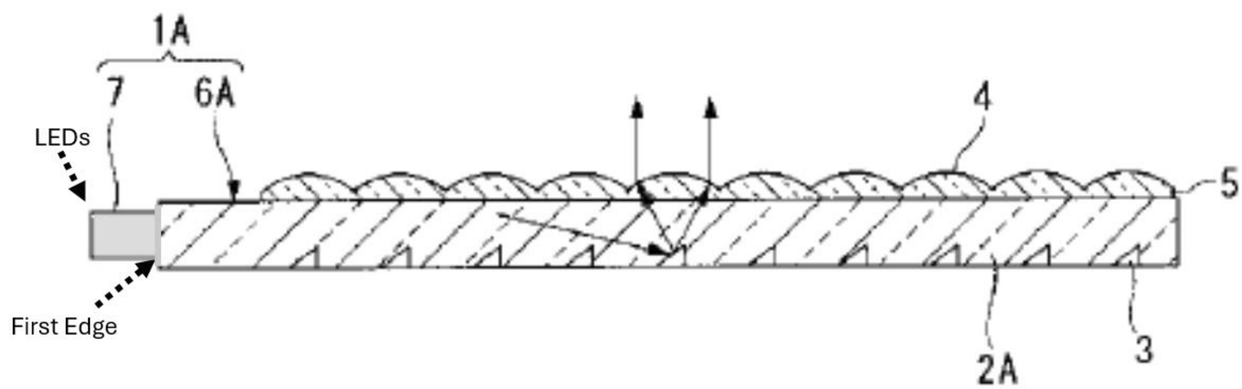
In addition, the M.P.E.P. makes clear that “where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.” M.P.E.P. § 2144.04.IV.A (citing *Gardner*, 725 F.2d 1338). To the extent the only difference between claim 1 and *Mitsuru* is the relative dimensions, claim 1 cannot be patentably distinct. Ex. C ¶ 86 n.8.

One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "and a distance between the third and fourth edges is at least 20 times greater than the thickness of the optically transmissive plate." *Id.* ¶¶ 85-88.

k. [1J]: "a plurality of light emitting diodes optically coupled to the first edge and configured to emit a divergent light beam towards the first edge;"

Mitsuru discloses or renders obvious "a plurality of light emitting diodes optically coupled to the first edge and configured to emit a divergent light beam towards the first edge." *Id.* ¶¶ 89-91.

Mitsuru discloses that the light guide includes "light source 7." *Mitsuru* at [0023]. According to *Mitsuru*, this light source "may be appropriately selected from among light sources which are conventionally known as light sources used as planar light sources for liquid crystal display devices, etc., such as [a light emitting diode ("LED")]." *Id.* at [0026]; *see also id.* at [0003]. This is shown below:



Id. at Fig. 1 (annotated). *Mitsuru* discloses that, in Example 1, this light source includes "five LEDs." *Id.* at [0048]; *see also id.* at [0050]. These LEDs are configured to emit light to enter the light guide plate 2A from "a side surface" (i.e., the "first edge") and "propagate[]" through the plate. *Id.* at [0023]. One of ordinary skill would have understood that an LED, such as disclosed

by *Mitsuru*, emits a divergent light by emitting light that travels in all directions away from the light source. Ex. C ¶ 90.

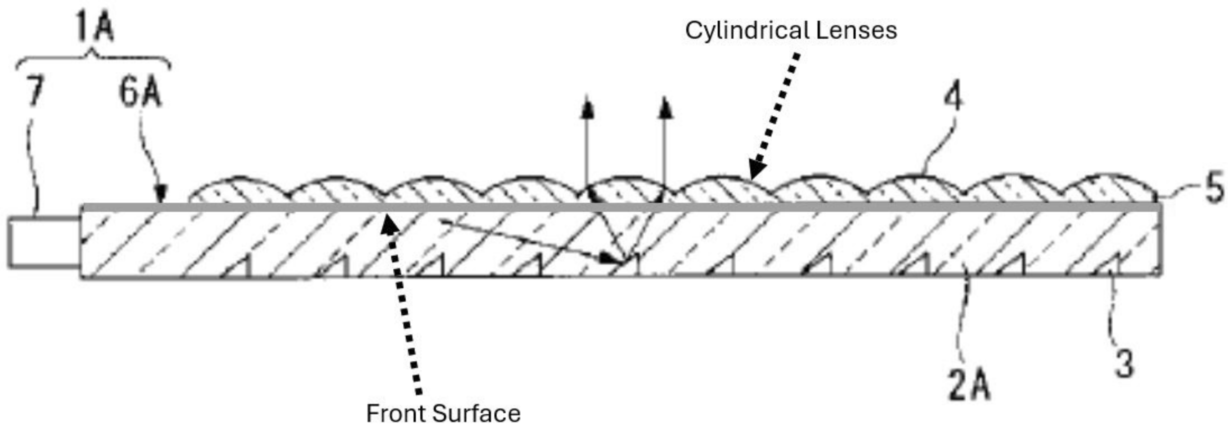
In the related litigation, the parties agreed to construe "optically coupled" as "providing for transfer of light from one optical component to another." *See* L-2 at 5; L-3 at 4. *Mitsuru*'s disclosure meets this construction. *Mitsuru*'s LEDs emit light that is transferred from the LED to light guide plate 2A, via the first edge. Ex. C ¶ 91.

One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "a plurality of light emitting diodes optically coupled to the first edge and configured to emit a divergent light beam towards the first edge." *Id.* ¶¶ 89-91.

l. [1K]: "a lenticular array of linear cylindrical lenses formed in the front surface and extending along straight parallel lines between two opposing edges of the optically transmissive plate;"

Mitsuru discloses "a lenticular array of linear cylindrical lenses formed in the front surface and extending along straight parallel lines between two opposing edges of the optically transmissive plate." *Id.* ¶¶ 92-96.

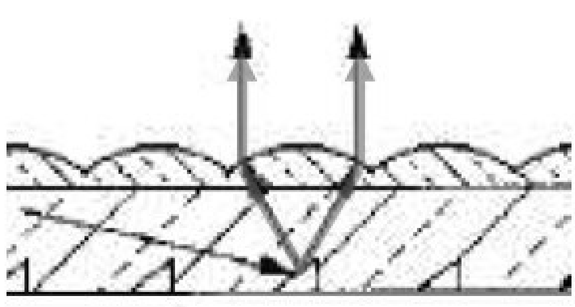
Mitsuru's light guide includes "a sheet which is arranged on the front surface side of the light guide plate and comprises microlenses or ***cylindrical lenses*** arranged alongside each other." *Mitsuru* at [0007] (emphasis added); *see also id.* at [0032]. These lenses are shown below, along the front surface of light guide plate 2A:



Id. at Fig. 1 (annotated).

Mitsuru further teaches that "[t]he sheet 5 comprising the lenses 4 arranged alongside each other[] and the light guide plate 2A may be separately molded and stacked for use, or they may be integrally molded." *Id.* at [0037]. In either case (i.e., molded or stacked for use), the cylindrical lenses are "formed in the front surface," as claimed.

One of ordinary skill in the art would have understood that these cylindrical lenses constitute "a lenticular array of linear cylindrical lenses," as claimed. Ex. C ¶ 94. A "lenticular array" is a group of lenses arranged so as to collimate the light rays, which, as can be seen below, is what is done by *Mitsuru*'s lenses:



Mitsuru at Fig. 1 (excerpted, annotated); *see also id.* at [0028] ("[T]he planar light source 1A is capable of reducing the angle of spread of light and is therefore especially useful when applied to a backlight, etc.[,] for a liquid crystal display device such as a cellular telephone in particular, where it is desirable to avoid letting another person see the screen.").

This lens array is also "linear" as claimed because the lenses extend in a linear fashion from one edge to another of light guide plate 2A. Ex. C ¶ 95; *see Mitsuru* at [Claim 1] (reciting "a sheet which is arranged on the front surface side of the light guide plate and comprises microlenses or cylindrical lenses arranged alongside each other corresponding to each of the reflection grooves"), [0047] ("The microlenses 4 were arranged so that centers thereof and centers of the reflection surfaces of the individual prismatic reflection grooves 3 were aligned when viewed from the front face."). The cylindrical lenses extend along straight parallel lines between two opposing edges of light guide plate 2A ("the optically transmissive plate"). Ex. C ¶ 95.

In other proceedings, Patent Owner has argued for this limitation that "Mitsuru does not disclose or suggest that these lenses, as part of [light guide plate] 2A, would form a part of a flexible structure." Credelle Rpt. ¶ 1375. Claim 1, however, does not require that these lenses form a part of a flexible structure. Instead, claim 1 only requires the "optically transmissive plate" have a "flexible . . . structure." '135 patent at 57:39-40. Nevertheless, *Mitsuru* does teach that the lenses are part of a flexible structure. According to *Mitsuru*, "[t]he sheet 5 comprising the lenses 4 arranged alongside each other[] and the light guide plate 2A . . . may be integrally molded." *Mitsuru* at [0037]. And, "[f]or applications where flexibility is required, the thickness of the light guide plate 2A is preferably in a range of 0.05 mm-3 mm." *Id.* at [0031]; *see also id.* at [0040]. One of ordinary skill would have understood that, because *Mitsuru* teaches that light guide plate 2A can be used in flexible structures, the other elements of the planar light-source light guide

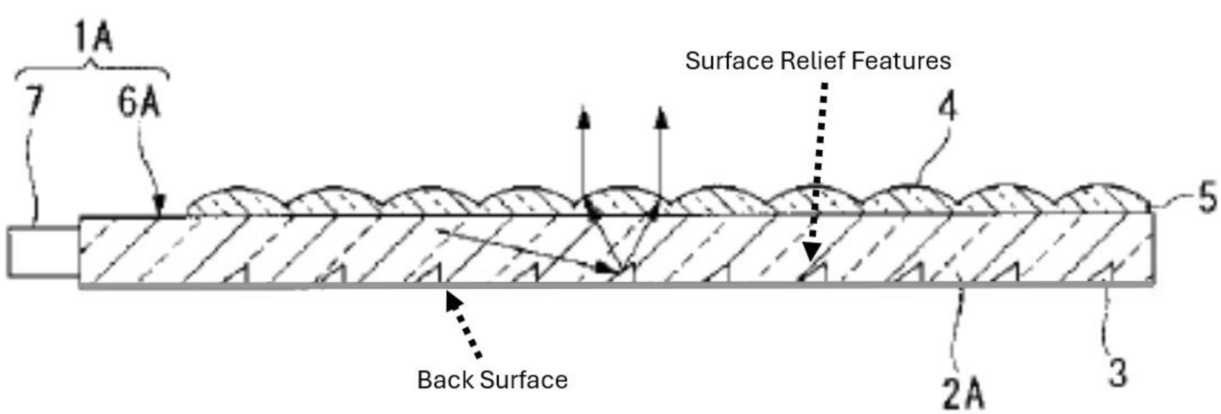
that are part of the same integral mold, including the lens array, would likewise be flexible. Ex. C ¶ 96.

One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "a lenticular array of linear cylindrical lenses formed in the front surface and extending along straight parallel lines between two opposing edges of the optically transmissive plate." *Id.* ¶¶ 92-96.

m. [1L]: "a plurality of discrete light extracting surface relief features formed in the back surface according to a two-dimensional pattern such that individual ones of the plurality of the discrete light extracting surface relief features are separated from one another and from each of the first, second, third, and fourth edges by smooth and planar portions of the back surface;"

Mitsuru discloses or renders obvious "a plurality of discrete light extracting surface relief features formed in the back surface according to a two-dimensional pattern such that individual ones of the plurality of the discrete light extracting surface relief features are separated from one another and from each of the first, second, third, and fourth edges by smooth and planar portions of the back surface." *Id.* ¶¶ 97-103.

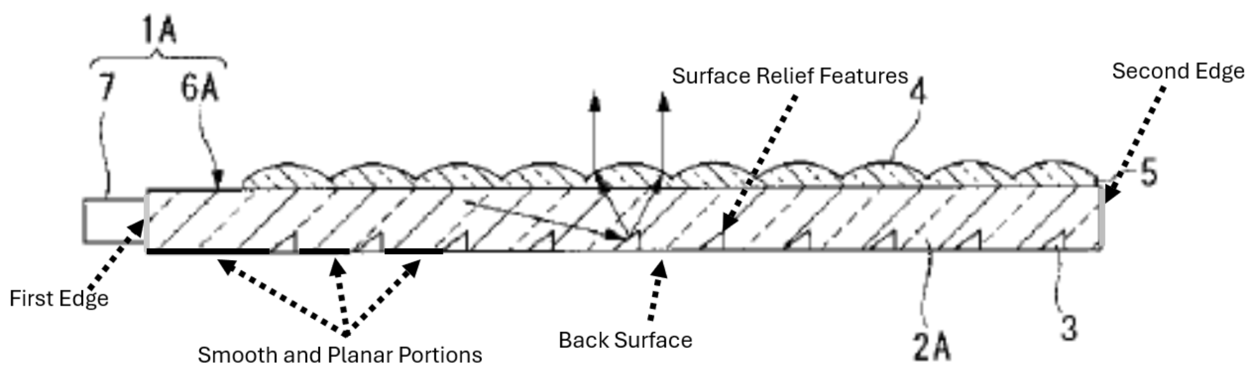
Mitsuru discloses that light guide plate 2A includes "a plurality of prismatic reflection grooves 3 . . . provided on a back surface side." *Mitsuru* at [0023]. These grooves, which are the claimed "light extracting surface relief features formed in the back surface," are shown below:



Id. at Fig. 1 (annotated). These "reflection grooves 3 have a triangular cross-sectional shape, and the angle of inclination of the surface which reflects light is preferably in a range of 40°-50° in relation to the plane of the light guide plate." *Id.* at [0040].

As discussed above in Section VII.A.1, a POSITA would have found it obvious to look to the dimensions and implementation details taught by Example 1 since *Mitsuru* does not describe in detail all features of Figure 1 (e.g., dimensions and pattern of grooves). *Mitsuru* discloses with respect to Example 1 that these reflection grooves are positioned according to a two-dimensional pattern[3] by disclosing that these grooves can be "formed at an average density of 25 grooves/mm^2 on one surface (bottom surface)." *Id.* at [0046]. *Mitsuru* further discloses, with respect to the pattern, that "[t]he density of the reflection grooves 13 was increased further away from the light source 7 so that the average brightness was uniform." *Id.* at [0050]. Indeed, such patterns were well known in the prior art. *See, e.g.*, Ex. C ¶ 100; *Kobayashi* at 77-78.

Mitsuru's reflection grooves are also separated from one another by smooth and planar portions of the back surface. This is shown in the figure below:



[3] One of ordinary skill in the art would have understood that claim 1 is not limited to either an ordered or random pattern. Ex. C ¶ 99 n.9. For example, claim 2, which further depends from independent claim 1, recites that "at least some of the discrete light extracting surface relief features have randomized positions within the two-dimensional pattern." '135 patent at 58:23-26; *see also id.* at 47:40-42 ("[P]rismatic grooves 14 and lenslets 6 can be positioned and aligned in accordance to a pre-selected ordered or randomized pattern.").

Mitsuru at Fig. 1 (annotated). One of ordinary skill in the art would have understood that the sections of the back surface that do not have reflection grooves are characterized by surfaces that are both smooth (i.e., lacking any deformities in the surface) and planar. Ex. C ¶ 101. The first and second edge are illustrated above.

Although the figure above does not depict the third and fourth edges, one of ordinary skill in the art would have understood that the reflection grooves would be similarly positioned apart from the third and fourth edges. *Id.* ¶ 102. Indeed, as Mr. Flasck explains, *Mitsuru* discloses specific "heights," "widths," and "angle of inclination" for reflection grooves 3. *Id.*; *Mitsuru* at [0046]. There would be no reason to disclose both heights and widths in addition to reflection angles if widths were geometrically related to the heights and reflection angles, so one of ordinary skill in the art would recognize that the widths are measured along an axis connecting the third and fourth edges. Ex. C ¶ 102. Because the widths are much smaller than the 100 mm plate length, the reflection grooves would be separated from one another and from the third and fourth edges. *Id.*

In addition, Dr. Flasck further explains that running reflection grooves from edge to edge, without smooth planar portions between the grooves and the third and fourth edges, would have resulted in light intensity differences in a direction perpendicular to the reflection grooves. *Id.* Adding smooth planar portions between the grooves and the edges (as *Mitsuru* expressly discloses for the first and second edges and implicitly discloses for the third and fourth edges) would result in a more uniform light intensity across the light guide plate. *Id.* And even if not disclosed, one of ordinary skill would have found smooth planar portions between the grooves and the edges to be an obvious modification to *Mitsuru*'s light guide plate to achieve uniform light intensity. Ex. C ¶ 103. Such a modification would have entailed nothing more than modifying the size and/or position of the reflection grooves, leaving a smooth planar surface between the grooves and the

edges, and one of ordinary skill would have thus had a reasonable expectation of success in doing so. *Id.*

One of ordinary skill in the art would thus have understood that *Mitsuru* discloses or renders obvious "a plurality of discrete light extracting surface relief features formed in the back surface according to a two-dimensional pattern such that individual ones of the plurality of the discrete light extracting surface relief features are separated from one another and from each of the first, second, third, and fourth edges by smooth and planar portions of the back surface." *Id.* ¶¶ 97-103.

n. [1M]: "a reflective surface approximately coextensive with the optically transmissive plate and positioned on a back side of the optically transmissive plate; and"

Mitsuru discloses or renders obvious "a reflective surface approximately coextensive with the optically transmissive plate and positioned on a back side of the optically transmissive plate." *Id.* ¶¶ 104-106.

One of ordinary skill would have expected *Mitsuru*'s light guide plate to include a reflecting sheet approximately coextensive with the plate and positioned on a back side of the plate. *Id.* ¶ 105. And even if it was not included, one of ordinary skill in the art would have been motivated to modify *Mitsuru* to add such a sheet to improve the efficiency of *Mitsuru*'s light guide plate, and would have had a reasonable expectation of success in doing so. *Id.* According to *Mitsuru*, light enters light guide plate 2A "from a side surface" via a divergent beam and propagates through the guide plate. *Mitsuru* at [0023]. As discussed above, light guide plate 2A "may be a transparent material." *Id.* at [0025]. One of ordinary skill in the art would have understood that for a divergent light to propagate through *Mitsuru*'s transparent plate—and efficiently redirect a substantial portion of that light out of the light guide plate toward a viewer—

there would need to be a reflective surface coextensive with the back surface of light guide plate 2A. Ex. C ¶ 105. That sheet would need to be approximately coextensive with the back surface to ensure that the sheet is positioned to reflect as much light as possible propagating toward the back surface. *Id.*

Indeed, one of ordinary skill in the art would have understood that a "reflector sheet" is one of the "basic constituent parts" of an LED backlight. *Id.* ¶ 106; *see supra* Section III.D; *Abileah* at 29; *Gandhi* at 14:43-53; *Kobayashi* at 74. Such sheets were well understood to improve the efficiency of light guides. *See* Ex. C ¶ 106; *Abileah* at 29; *Kobayashi* at 76 (discussing efficiency gains due to reflector sheets). This reflector sheet is depicted below, coextensive with the back surface of the light guide:

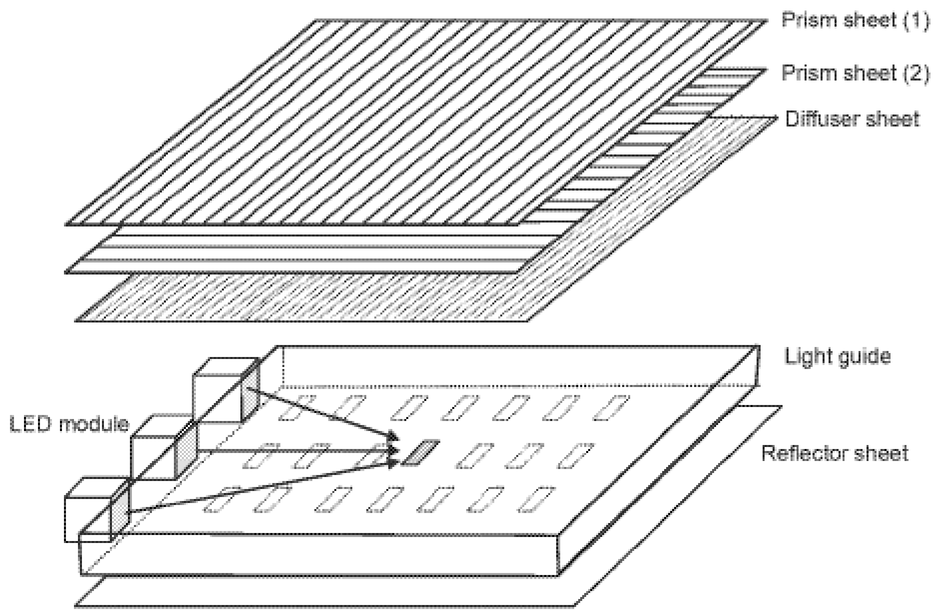


Figure 6.1 Basic structure of an LED backlight unit.

Kobayashi at 74, Fig. 6.1. *Kobayashi* explains that "[t]he reflector sheet is disposed at the lower surface of the light guide (Figure 6.1) and has the function of reflecting light that has escaped from the light guide back to the light guide again." *Id.* at 81-82; *see also Abileah* at 29; *Kunimochi* at

5:50-55 ("The light reflecting sheet 32 is adapted to reintroduce into the light guide plate 2 light emitted from the LED 30 into the light guide plate 2 and leaking out from the bottom surface 2c.").

One of ordinary skill in the art would thus have understood that *Mitsuru* discloses or renders obvious "a reflective surface approximately coextensive with the optically transmissive plate and positioned on a back side of the optically transmissive plate." Ex. C ¶¶ 104-106.

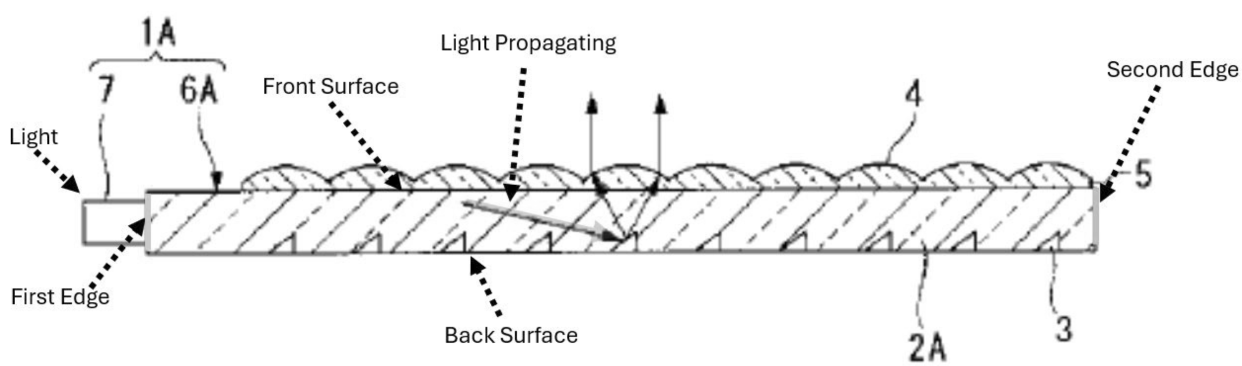
o. [1N]: "a light diffusing layer approximately coextensive with the optically transmissive plate,"

Mitsuru discloses "a light diffusing layer approximately coextensive with the optically transmissive plate." *Id.* ¶¶ 107-108. As one example, *Mitsuru* discloses use of a "diffusion sheet" on the "front face" (i.e., "front surface") of the light guide plate. *See, e.g.*, *Mitsuru* at [0021], [0030], [0049]. One of ordinary skill would understand that a sheet positioned on the front face of the light guide plate is a sheet that is approximately coextensive with the light guide plate. Ex. C ¶ 107. *Mitsuru* teaches that a "diffusion sheet" addresses "unevenness in the brightness distribution" of light emitted from the planar light-source light guide. *Mitsuru* at [0049]. In one exemplary embodiment (i.e., the same exemplary embodiment addressed in Sections VII.A.2.i, VII.A.2.j, VII.A.2.k), "[w]hen the center of the angular distribution of light emitted from the planar light-source light guide 6C was measured, it was found to be 22°. There was a certain level of unevenness in the brightness distribution, so a diffusion sheet was further stacked, which eliminated the unevenness." *Id.* One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "a light diffusing layer approximately coextensive with the optically transmissive plate." Ex. C ¶¶ 107-108.

p. [1O]: "wherein the optically transmissive plate is configured to receive light on the first edge, guide the light received on the first edge towards the second edge using optical transmission and total internal reflection, and distribute the light received on the first edge from both the front and back surfaces towards divergent directions,"

Mitsuru discloses or renders obvious "wherein the optically transmissive plate is configured to receive light on the first edge, guide the light received on the first edge towards the second edge using optical transmission and total internal reflection, and distribute the light received on the first edge from both the front and back surfaces towards divergent directions." *Id.* ¶¶ 109-116.

Mitsuru discloses that the light enters light guide plate 2A "from the side surface side." *Mitsuru* at [0021]. As discussed above in Section VII.A.2.e, this "side surface side" is the claimed "first edge." This light then "propagate[s]" through the light guide plate (i.e., light rays travel via "optical transmission") toward the second edge (e.g., the opposing end of the plate). *Id.* This is illustrated below, with the annotated light propagating from the first edge toward the second edge:



Id. at Fig. 1 (annotated).

In the parallel litigation, the parties agreed that "total internal reflection" referred to "the phenomenon that involves the reflection of all the incident light off the boundary between a first medium and a second medium of lower refractive index, when the angle of incidence to the second

medium exceeds the critical angle." *See supra* Section IV.E. This is disclosed by *Mitsuru*. *Mitsuru* discloses that light guide plate 2A is a first medium, sandwiched between a second medium of a lower refractive index. *Mitsuru* at [Claim 3], [0009], [0025], [0037]. *Mitsuru* discloses that, as a result of this structure, "[t]he light which has entered [light guide plate 2A] undergoes repeated total reflection within the light guide plate and is propagated." *Id.* at [0003]. One of ordinary skill in the art would have understood that *Mitsuru*'s disclosure of "total reflection" is equivalent to the claimed "total internal reflection." Ex. C ¶ 111.

One of ordinary skill in the art would have understood that this phenomenon is what is described by *Mitsuru*, where light that enters the light guide plate undergoes "repeated total reflection." *Id.* ¶ 112; *Mitsuru* at [0003]. *Mitsuru* discloses that the purpose of introducing "processed parts" to the back surface (e.g., by adding reflective grooves) is "to deviate from total reflection conditions," such that "the light leaks to an outer surface of the light guide plate." *Mitsuru* at [0003]. One of ordinary skill would have understood that this is another way of describing "total internal reflection," as claimed. Indeed, other prior art made clear that a well-known "operating principle of the edge-light type backlight unit" involves "light [that] is propagated along the light guide by total internal reflection." *Kobayashi* at 244.

Other prior art forming the knowledge of one of ordinary skill likewise confirms that *Mitsuru*'s disclosure of "total reflection" refers to "total internal reflection," as claimed. Ex. C ¶ 113. For example, similar to *Mitsuru*, U.S. Patent No. 7,777,834 ("*Uehara*") is a patent with Japanese origins directed to a "light source device" for use with "liquid crystal display devices." *Uehara* at 1:8-40. *Uehara* uses the phrase "repeated total reflection," just like *Mitsuru*, to describe the concept of total internal reflection:

> The following discussion of the optical path of this light focuses upon that part of this mixed light which is propagated within the XY

> plane. As shown in FIG. 7, due to the difference in refractive indices of the air and the resin material that makes up the light-guide plate 3, the angle formed by the direction of advance of light that has entered the light-guide plate 3 and the +X direction in the Z-axis direction is smaller than 41.80, based on Snell's law. Considered herein is light L1 that is inclined by 41.8° in the +Z direction with respect to the +X direction.
>
> While this light does reach the light-emitting surface 3b of the light-guide plate 3, the angle thereof with respect to the Z-axis direction is 48.2°. ***Since this angle is greater than the critical angle of 41.8°, the light is totally reflected without exiting from the light-guide plate 3***. Similarly, at the light-diffusing surface 3c as well, light incident on areas other than the inclined surface 3d is totally reflected at the same angle, so that the light is propagated in the direction away from the white LEDs 51 and the bluish white LEDs 52 while undergoing ***repeated total reflection*** between the light-emitting surface 3b and the light-diffusing surface 3c. ***In the course of this propagation, when light L1 is incident on the inclined surface 3d whose incline angle with respect to the X-axis direction is 6°, the angle of this light will be 42.2° from the normal line of the inclined surface 3d, and since this value is greater than the critical angle of 41.8°, the light is totally reflected and does not exit the light-guide plate 3 from the inclined surface 41***. However, the angle of the totally reflected light L1 with respect to the Z-axis direction is 36.2°, and since this angle is smaller than the critical angle, light reaching the light-emitting surface 3b exits to the outside from the light-guide plate 3, with the angle subsequent to exit being 62.4° with respect to the Z-axis direction.

Id. at 14:7-39 (emphases added). One of ordinary skill in the art would have understood that this description of "repeated total reflection"—the same term that is used by *Mitsuru*—likewise describes "total internal reflection," as claimed. Ex. C ¶ 113.

In other proceedings, Patent Owner has argued for this limitation that, "[w]hile TIR is a well-known principle in the field of optics, asserting that Mitsuru's structure operates specifically through TIR is an inferential leap." Credelle Rpt. ¶ 1221; *see also id.* ¶ 1383 (incorporating by reference the argument for a different prior art combination to challenge *Mitsuru*). Patent Owner further alleged that *Mitsuru* "leaves open the interpretation that other forms of reflection, such as

specular reflection, could be responsible for the propagation of light within the light guide plate. It is plausible that a light guide plate could be designed with a reflective coating or surface treatment that causes specular reflection, guiding light through the device without relying on TIR." *Id.* ¶ 1221.

Patent Owner's argument, however, "misapprehends the obviousness inquiry, which is not limited to the express disclosures of the prior art but instead involves what 'a person of ordinary creativity . . .' would understand from the prior art." *GUI Glob. Prods., Ltd. v. Samsung Elecs. Co.*, Nos. 2022-2156, -2157, -2158, -2159, 2024 WL 1564694, at *3 (Fed. Cir. Apr. 11, 2024) (quoting *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007)). And here, as Mr. Flasck explains, one of ordinary skill in the art would have understood *Mitsuru*'s "total reflection" to refer to "total internal reflection," as claimed. Ex. C ¶ 112.

Indeed, Patent Owner noted that "TIR is a well-known principle." Credelle Rpt. ¶ 1221. In discussing the "BACKGROUND OF THE PATENTS-IN-SUIT," Patent Owner's technical expert opined that "[t]he [light guide plate] in an edge-lit backlight uses total internal reflection to guide light from the LED sources and utilizes some means of light extraction from the [light guide plate] towards the LCD." *Id.* ¶ 320. This is the optimal mechanism for light distribution in a light guide plate, and even to the extent not expressly disclosed, would be an obvious, simple, and straightforward implementation of *Mitsuru*'s disclosure. Ex. C ¶ 115. Patent Owner's generalized opinion that a light guide plate uses total internal reflection is inconsistent with Patent Owner's subsequent argument regarding other "plausible" implementations of *Mitsuru*'s light guide plate. Credelle Rpt. ¶ 1221. Indeed, Patent Owner was unable to identify any disclosure in *Mitsuru* to support its alternative explanation of the phrase "total reflection."

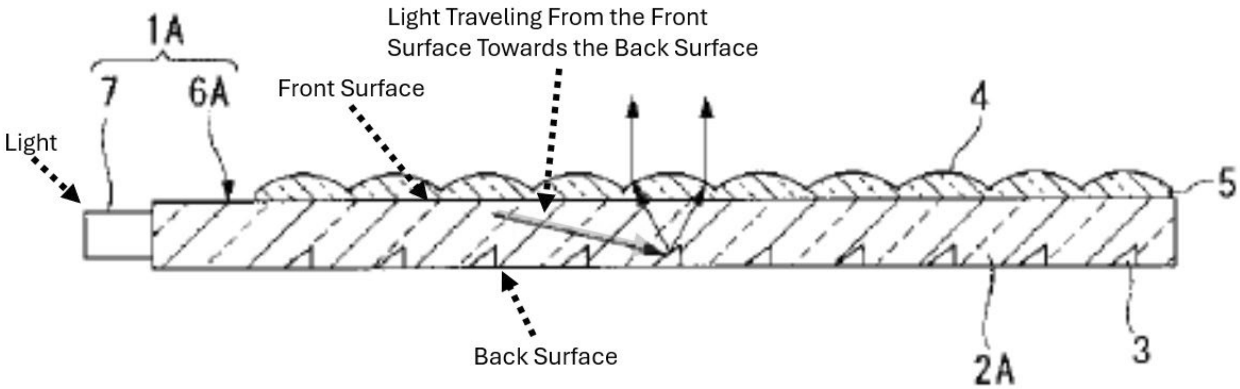
One of ordinary skill would also have understood that "the optically transmissive plate" is also "configured to . . . distribute the light received on the first edge from both the front and back surfaces towards divergent directions." Ex. C ¶ 116. As discussed in Section VII.A.2.k, one of ordinary skill would have understood that *Mitsuru*'s LEDs emit a divergent light by emitting light that travels in all directions away from the light source. *Id*. Once emitted from *Mitsuru*'s LEDs, a portion of the divergent light would reflect off the front and back surfaces and would propagate in multiple different directions. *Id*.

One of ordinary skill in the art would thus have understood that *Mitsuru* discloses or renders obvious "wherein the optically transmissive plate is configured to receive light on the first edge, guide the light received on the first edge towards the second edge using optical transmission and total internal reflection, and distribute the light received on the first edge from both the front and back surfaces towards divergent directions." *Id*. ¶¶ 109-116.

q. [1P]: "wherein the optically transmissive plate is further configured to receive light on the front surface and propagate the light received on the front surface towards the back surface,"

Mitsuru discloses "wherein the optically transmissive plate is further configured to receive light on the front surface and propagate the light received on the front surface towards the back surface." *Id.* ¶¶ 117-118.

Mitsuru discloses that "[t]he light which has entered [light guide plate 2A] undergoes repeated total reflection within the light guide plate and is propagated." *Mitsuru* at [0003]. This total reflection includes, as shown below, propagating light toward the front surface and then to the back surface:



Id. at Fig. 1 (annotated).

Mitsuru's disclosure described above is consistent with how Patent Owner alleged infringement at trial in the parallel litigation. During trial, Patent Owner's technical expert stated the following with respect to Acer's products and this claim limitation: "So the light guiding plate is configured to receive light on the front surface. Now, the front surface is the top of the light guide plate. We know that the light originates at the LEDs, but the light goes through the light guide plate. And . . . as I had said before, the light goes up to that optical film structure and goes backwards. So this design and this optical system has light going back towards that upper surface, again, through that lens and then into the -- towards the back surface of the light guide plate." L-6 at 224:11-225:2.

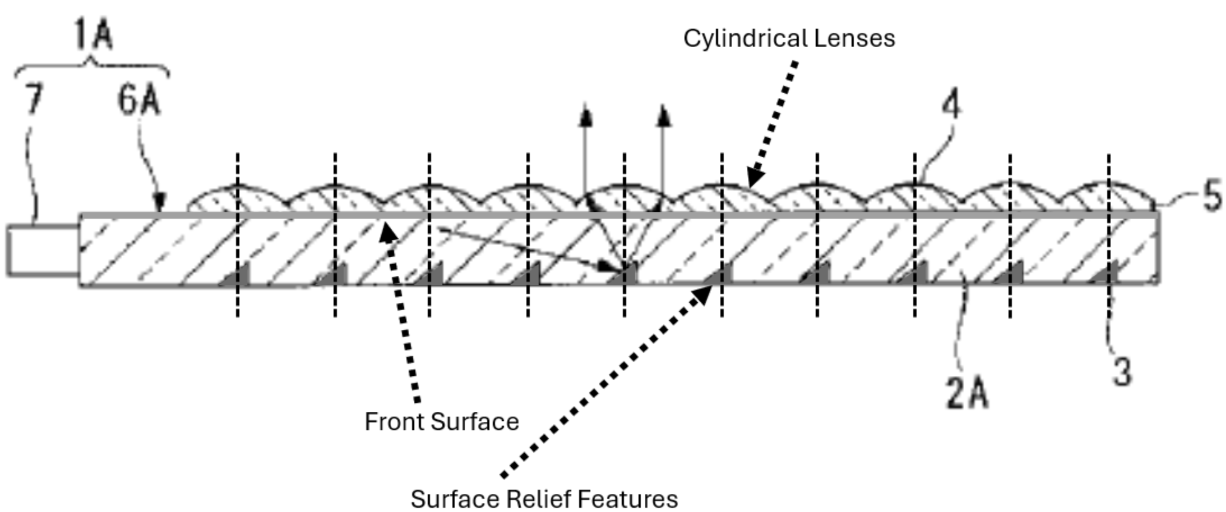
In other proceedings, Patent Owner has argued for this limitation that "Mitsuru nowhere discloses or suggests that the prism sheet receives light and propagates the light towards the back surface (having reflection grooves 3)." Credelle Rpt. ¶ 1385; *see also id.* (contending that *Mitsuru* fails to disclose that "light is recycled within the backlight by bouncing from a prism sheet located in front of [the light guide plate]" (emphasis omitted)). But as indicated by the figure above, *Mitsuru*'s figures expressly show exactly this. Ex. C ¶ 118.

One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "wherein the optically transmissive plate is further configured to receive light on the front surface and propagate the light received on the front surface towards the back surface." *Id.* ¶¶ 117-118.

r. [1Q]: "wherein an area occupied by each of the linear cylindrical lenses is substantially greater than an area occupied by each of the plurality of the discrete light extracting surface relief features,"

Mitsuru discloses "wherein an area occupied by each of the linear cylindrical lenses is substantially greater than an area occupied by each of the plurality of the discrete light extracting surface relief features." *Id.* ¶¶ 119-122.

Mitsuru's figures and accompanying description show that the cylindrical lenses occupy a substantially greater area than each of the plurality of reflection grooves (i.e., "surface relief features"). *Mitsuru* discloses that "[t]he microlenses 4 were arranged so that centers thereof and centers of the reflection surfaces of the individual prismatic reflection grooves 3 were aligned when viewed from the front face." *Mitsuru* at [0047]. This is shown below, with the dotted axis showing this center alignment:



Id. at Fig. 1 (annotated). Viewing the area of the cylindrical lenses from the perspective of the front surface (e.g., looking down into the lenses), one of ordinary skill in the art would have understood that the area covered by individual lenses is substantially greater than the area covered by individual reflection grooves. Ex. C ¶ 120.

Indeed, *Mitsuru* explains that "one lens 4 . . . may correspond to a plurality of reflection grooves 3." *Mitsuru* at [0024]. One of ordinary skill would thus have understood that, from the perspective of the front surface, the area of each lens is substantially greater than each reflection groove. These size differences are necessary to allow the lenses to "condense light reflected from the reflection groove 3." *Id.* If the area of the groove is larger than the area of the lens, this function would not be achieved. Ex. C ¶ 121.

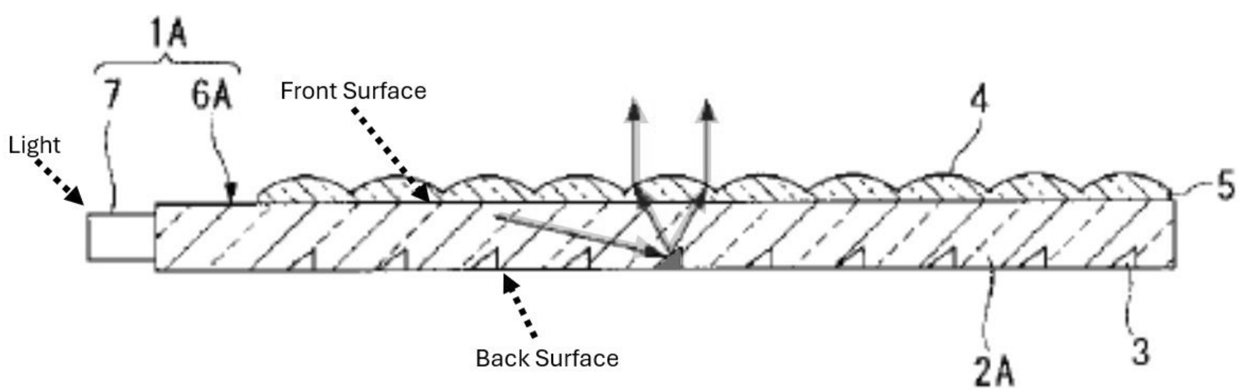
In other proceedings, Patent Owner has argued for this limitation that "Mitsuru does not disclose or suggest the [dimensions] of the cylindrical lenses." Credelle Rpt. ¶ 1389. But precise dimensions are not necessary to meet this claim limitation, especially where as here, both the written description and figures make clear that a certain size relationship (that meets the requirements of the claim) is necessary for operation of the device. Ex. C ¶ 122.

One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "wherein an area occupied by each of the linear cylindrical lenses is substantially greater than an area occupied by each of the plurality of the discrete light extracting surface relief features." *Id.* ¶¶ 119-122.

s. [1R]: "and wherein at least one of the plurality of discrete light extracting surface relief features is configured to disrupt total internal reflection at the back surface and extract at least some light propagated in the optically transmissive plate towards the reflective surface."

Mitsuru discloses or renders obvious "and wherein at least one of the plurality of discrete light extracting surface relief features is configured to disrupt total internal reflection at the back surface and extract at least some light propagated in the optically transmissive plate towards the reflective surface." *Id.* ¶¶ 123-126.

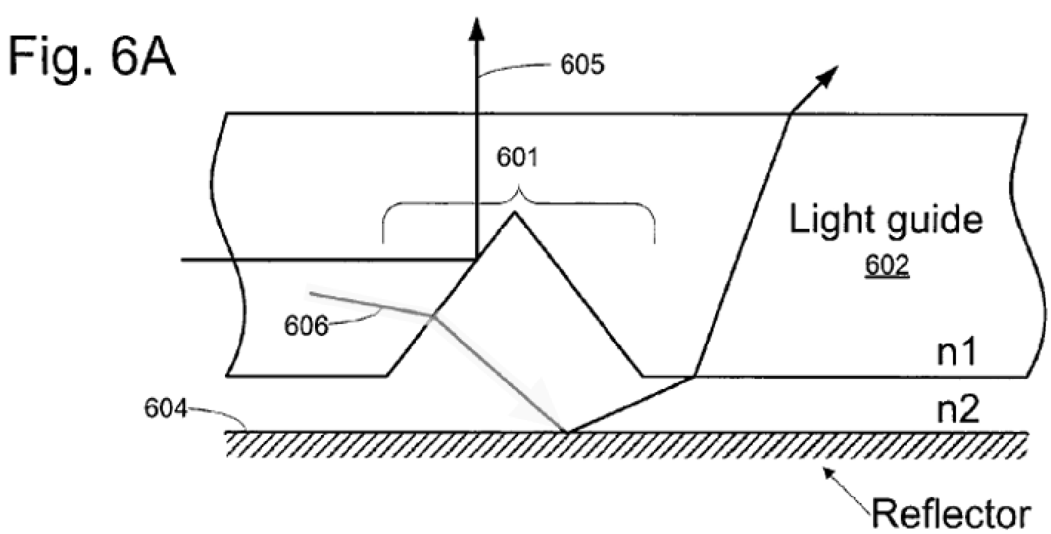
Mitsuru discloses that "light that entered from the side surface side and propagated is reflected to the front surface side by means of the prismatic reflection grooves 3 provided on the front surface side of the light guide plate 2A." *Mitsuru* at [0027]. This is illustrated below, where the highlighted reflection groove disrupts total reflection (i.e., "total internal reflection") at the back surface:



Id. at Fig. 1 (annotated). The light reflected off the reflection groove is light that was propagated in the optically transmissive plate towards the back and reflective surfaces. Ex. C ¶ 124. But, due to the presence of the reflection grooves, that light is "extracted" out of the waveguide and reflected toward the lens array. *Id.*

One of ordinary skill in the art would have also understood that certain light that propagates toward the reflection grooves would hit the reflection grooves at an angle that does not result in reflection toward the lens array. *Id.* ¶ 125. Instead, the light would be refracted downward, toward the reflecting surface discussed in Section VII.A.2.n. As *Mitsuru* explains, "[t]he prisms constituting the reflection grooves 3 have a triangular cross-sectional shape, and an angle of inclination of the surface which reflects light is preferably in a range of 40°-50° in relation to a plane of the light guide plate 2A. ***If the angle of inclination is below this range, then light is not readily refracted*** and reflected in a perpendicular direction by the lenses 4 . . . ." *Mitsuru* at [0034] (emphasis added). *Mitsuru* thus recognizes that, for certain angles of inclination, light will be refracted toward the reflecting sheet (i.e., bent) when it passes through the reflection grooves. Ex. C ¶ 125.

Indeed, other prior art that would form part of the background knowledge of an ordinary artisan illustrates this concept for similar surface relief features, as shown below.



Gandhi at Fig. 6A (annotated). According to *Gandhi*, "[l]ight ray 606 illustrates a ray that is refracted at the interface between the light guide 602 and the outside medium." *Id.* at 14:63-65.

"Light ray 606 is subsequently reflected from back reflective surface 604 and re-inserted into the light guide." *Id.* at 14:65-66. This is what would happen when *Mitsuru* includes a reflective sheet as discussed in Section VII.A.2.n. Ex. C ¶ 126.

One of ordinary skill in the art would thus have understood that *Mitsuru* discloses "and wherein at least one of the plurality of discrete light extracting surface relief features is configured to disrupt total internal reflection at the back surface and extract at least some light propagated in the optically transmissive plate towards the reflective surface." *Id.* ¶¶ 123-126.

3. Claim 16

a. "An edge-lit waveguide illumination system as recited in claim 1, wherein a focal length characterizing at least one of the linear cylindrical lenses is less than a distance between the lenticular array and the plurality of discrete light extracting surface relief features."

Mitsuru discloses or renders obvious "wherein a focal length characterizing at least one of the linear cylindrical lenses is less than a distance between the lenticular array and the plurality of discrete light extracting surface relief features." *Id.* ¶¶ 127-135.

One of ordinary skill in the art would have understood that the focal length of a lens can be calculated using the following equation: $f = R \; x \; \frac{n_2}{n_2 - n_1}$, where R is the radius of curvature, n_1 is the refractive index of air, and n_2 is the refractive index of the lens material. *See Hecht* at 135; Ex. C ¶¶ 128-129 (explaining that this equation applies to both spherical and cylindrical lenses). As discussed above in Section VII.A.1, one of ordinary skill would have found it obvious to look to the dimensions taught by Example 1. In that example, *Mitsuru* discloses "microlenses 4 with a radius of curvature R = 200 µm." *Mitsuru* at [0047]. *Mitsuru* further discloses that the "sheet 5 comprising the lenses 4" may be a "synthetic resin such as an acrylic resin." *Id.* at [0025]. One of ordinary skill in the art would have understood that the refractive index of acrylic is 1.49. Ex. C

¶ 130; *Winston* at 10:41-47; *Kobayashi* at 239, Table 19.1 (disclosing index for PMMA, which is also acrylic). And the refractive index of air is 1.0. Ex. C ¶ 130; *Winston* at 16:1-3; *Kobayashi* at 244, Fig. 19.5. Thus, using the known formula for calculating a focal length, *Mitsuru* discloses a focal length of 608 μm. Ex. C ¶ 130. Mr. Flasck confirmed this calculation using a ray-tracing program called Beam 4. *Id.* ¶¶ 131-135.

Mitsuru also discloses in Example 1 that the light guide plate has "a thickness of 1.1 mm." *Mitsuru* at [0046], [0047]. *Mitsuru* further discloses that the reflection grooves have "heights of 3-20 μm." *Id.* at [0046]. Given a plate thickness of 1.1 mm (i.e., 1100 μm) and a maximum reflection groove height of 20 μm, the "distance between the lenticular array and the plurality of discrete light extracting surface relief features" is at least 1,080 μm. Ex. C ¶ 135. The focal length of 608 μm (or 587.551 μm as measured using Beam 4) is less than 1,080 μm. *Id.* Indeed, any groove height in the range of 3 μm-20 μm will meet the dimensions of this claim. *Id.*

The M.P.E.P. makes clear that "where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device." M.P.E.P. § 2144.04.IV.A (citing *Gardner*, 725 F.2d 1338). To the extent the only difference between claim 16 and *Mitsuru* is the relative dimensions, claim 16 cannot be patentably distinct. Ex. C ¶ 135 n.12.

In other proceedings, Patent Owner has argued for this limitation that "Mitsuru does not specifically disclose or suggest that the lenses have a focal length less than the specified distance from the lenticular array and light extracting features," and "[t]he broad classification of shapes in Mitsuru simply does not equate to a disclosure of the precise focal length-to-distance relationship." Credelle Rpt. ¶ 1409. Patent Owner also argued that "[reliance on other publications] for technical

calculations is speculative and not grounded in the actual content of Mitsuru." *Id.* ¶ 1410. According to Patent Owner, "[w]ithout Mitsuru providing explicit material properties or precise dimensions, any calculation of focal length and its relationship to other components is conjectural." *Id.* This argument, however, is legally incorrect because one of ordinary skill in the art would read the prior art in the context of the background knowledge of an ordinary artisan, which includes these secondary references that detail material properties. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (finding the Board erred "[b]y narrowly focusing on the four prior-art references . . . and ignoring the additional record evidence [the challenger] cited to demonstrate the knowledge and perspective of one of ordinary skill in the art").

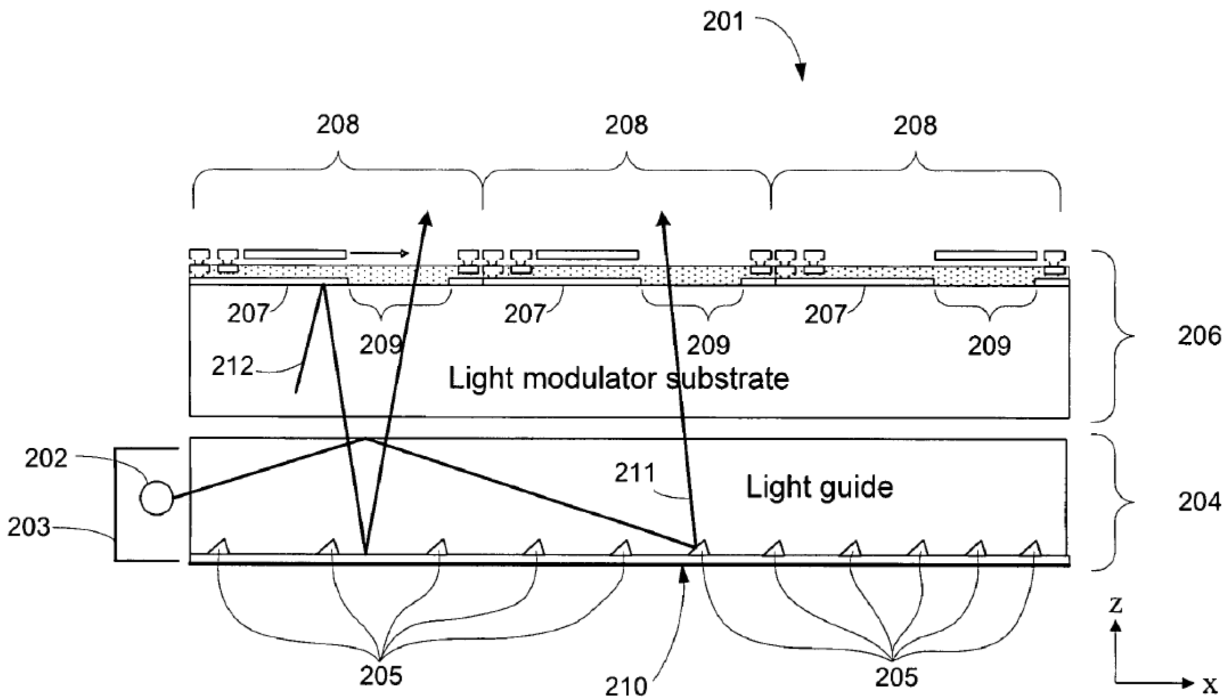
One of ordinary skill in the art would thus have understood that *Mitsuru* discloses or renders obvious "wherein a focal length characterizing at least one of the linear cylindrical lenses is less than a distance between the lenticular array and the plurality of discrete light extracting surface relief features." Ex. C ¶¶ 127-135.

B. *Mitsuru* in View of *Gandhi* Renders Claims 1 and 16 Obvious

As explained below, *Mitsuru* in view of *Gandhi* renders obvious independent claim 1 and dependent claim 16.

1. Overview of *Gandhi*

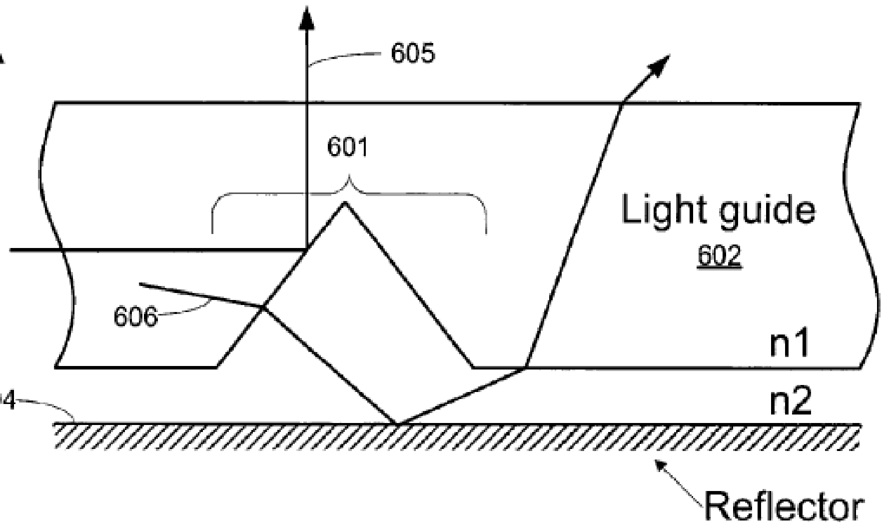
Like *Mitsuru*, *Gandhi* discloses improvements to a conventional light guide to enable "[a] more efficient method for delivering light to the viewer [of a display screen]." *Gandhi* at 8:37-40; Ex. C ¶¶ 136-139. In an exemplary embodiment, *Gandhi*'s "[d]isplay apparatus 201 includes a lamp 202, a lamp reflector 203, a light guide 204, a series of extraction elements 205, a light modulator substrate 206, [a] reflective aperture layer 207, a series of shutter assemblies 208[,] and a series of apertures 209." *Gandhi* at 8:40-44.



Id. at Fig. 2A. "The display apparatus also includes a back-reflector 210, which is located in a plane that is substantially parallel to that of the aperture layer 207." *Id.* at 8:44-47.

According to *Gandhi*, the "throughput efficiency" of prior art light guides is limited and "only 5 to 25% of the available illumination power in the backlight becomes available to the viewer." *Id.* at 6:22-25. *Gandhi*, however, teaches the use of reflective surfaces to recycle some of that lost light back into the light guide. *Id.* at 6:20-43, 12:55-61. *Gandhi*'s Figure 6A discloses one example of a reflective surface behind the back surface of the light guide. *Id.* at Fig. 6A. The light guide includes geometrical extraction structure 601, which is "suitable for inclusion in backlights used to form an improved optical cavit[y]." *Id.* at 14:24-28.

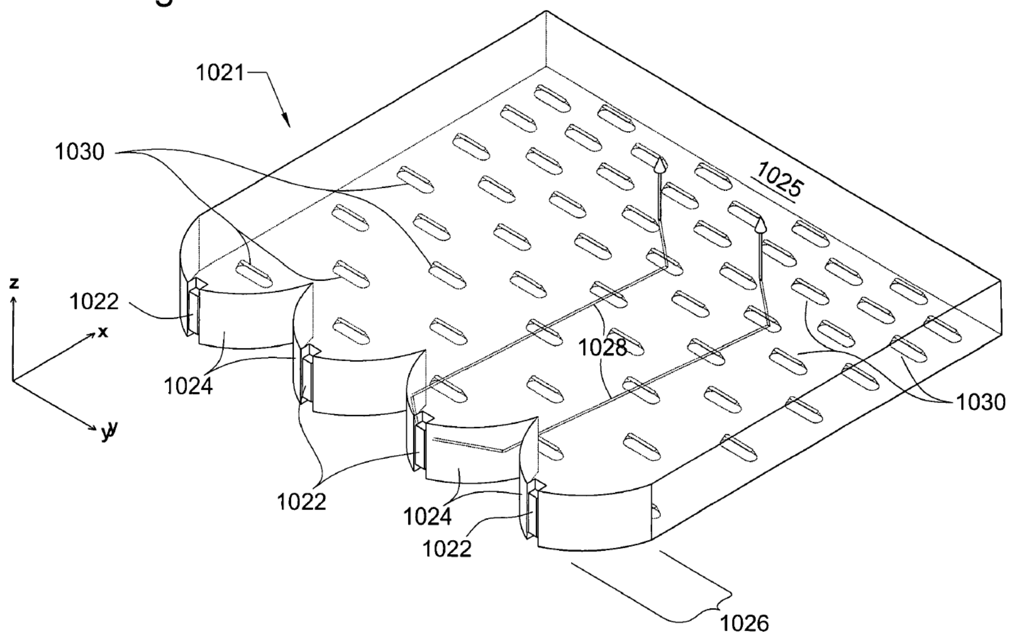
Fig. 6A



Id. at Fig. 6A. According to *Gandhi*, structure 601 is "associated with . . . a back-reflective surface 604." *Id.* at 14:43-45. This "surface can be formed from either a metallic surface or from a dielectric mirror" and "separated from the light guides by an air gap." *Id.* at 14:45-53.

Gandhi also teaches that, "to ensure uniformity of the [light] output, the deflectors [i.e., "extraction elements"] are placed or distributed in a controlled fashion along the light guide, in some cases with a lower density of deflectors 205 near to the lamp source and a higher density of deflectors further from the lamp." *Id.* at 8:40-44, 8:58-63. One exemplary layout is shown below.

Fig. 10B



Id. at Fig. 10B. According to *Gandhi*, the above backlight system is an "example of a backlight in which 3-dimensional control of angular divergence is established primarily by collimation out of a light injector 1026." *Id.* at 20:27-30. *Gandhi* discloses that "[a]ll of the deflectors 1030 are arranged with their long axes parallel to the y-axis, that is: the normal to the deflecting surfaces are contained within the x-z plane. The deflectors 1030 are arranged with unequal spacing in the light guide 1005. The closer spacing at distances further from the injector 1006 helps to ensure the uniformity of the emitted light." *Id.* at 21:13-18.

2. Motivation to Combine *Mitsuru* and *Gandhi*

One of ordinary skill in the art would have been motivated to modify *Mitsuru*'s light guide plate in view of *Gandhi*'s disclosure of "[a] more efficient method for delivering light to the viewer [of a display screen]." *Id.* at 8:37-40; Ex. C ¶¶ 140-149.

As an initial matter, both *Mitsuru* and *Gandhi* disclose very similar light guides to be used to deliver light to the viewer of a display screen. *Gandhi* at 8:37-44, Fig. 2A; *Mitsuru* at [0001].

Both references disclose devices that include light sources, light guides, and extraction elements. *See supra* Sections VII.A.1 (Overview of *Mitsuru*), VII.B.1 (Overview of *Gandhi*). Like *Mitsuru*, *Gandhi* discloses that light from the light source is distributed throughout the light guide "by means of total internal reflection." *Gandhi* at 7:3-4. Indeed, *Gandhi* explains that "[t]otal internal reflection occurs with 100% reflective efficiency when light is incident on a dielectric interface with angles above a critical angle." *Id.* at 14:35-38.

Gandhi would have motivated at least two different improvements to *Mitsuru*. First, one of ordinary skill in the art would have been motivated to modify *Mitsuru* in view of *Gandhi*'s teaching of the benefits of using a reflective surface coextensive with the back surface of the light guide, to the extent such surface is not already included in *Mitsuru*. Ex. C ¶¶ 142-146. As discussed in Section VII.A.2.k, *Mitsuru* discloses LEDs that emit divergent light into a light guide. Some percentage of the emitted light will undergo total internal reflection and be extracted to the view by the reflection grooves. But some other percentage of the light will be emitted in directions that do not result in total internal reflection and will not be extracted. *See Kobayashi* at 76. *Gandhi* teaches that the lighting efficiency (e.g., the amount of light that actually reaches the viewer) can be increased by using, in part, a reflective surface (or reflective sheet) that is parallel to the back surface. *Gandhi* at 6:20-40. This reflective surface would have enabled a light guide to recycle stray light emissions and potentially redirect that light toward the viewer. Ex. C ¶ 142.

Indeed, one of ordinary skill in the art would have understood that a "reflector sheet" is one of the "basic constituent parts" of an LED backlight. *Id.* ¶ 143; *supra* Section III.D; *Kobayashi* at 74. Such sheets were well understood to improve the efficiency of light guides. *See* Section III.D; *Kobayashi* at 76 (discussing efficiency gains due to reflector sheets). This reflector sheet is depicted below, coextensive with the back surface of the light guide:

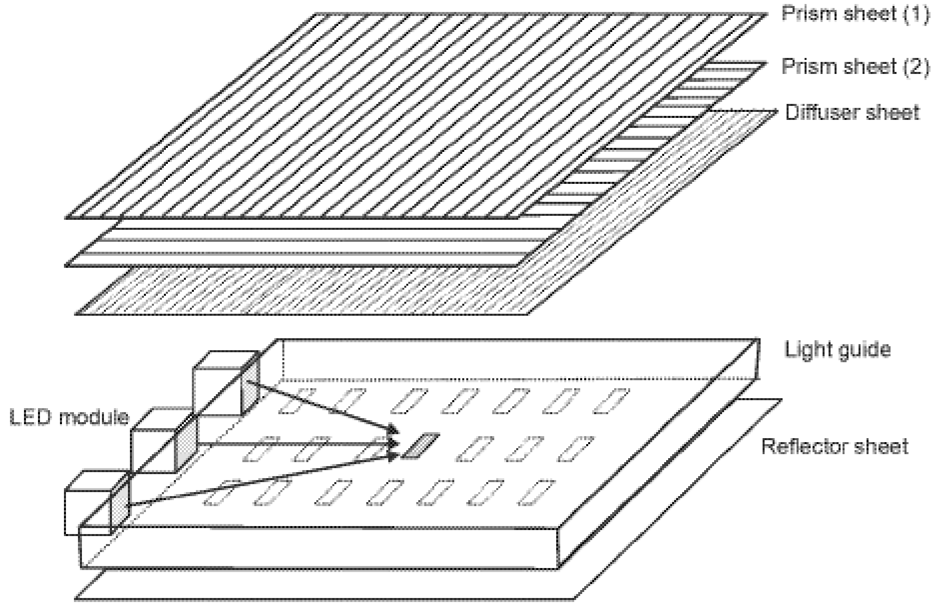


Figure 6.1 Basic structure of an LED backlight unit.

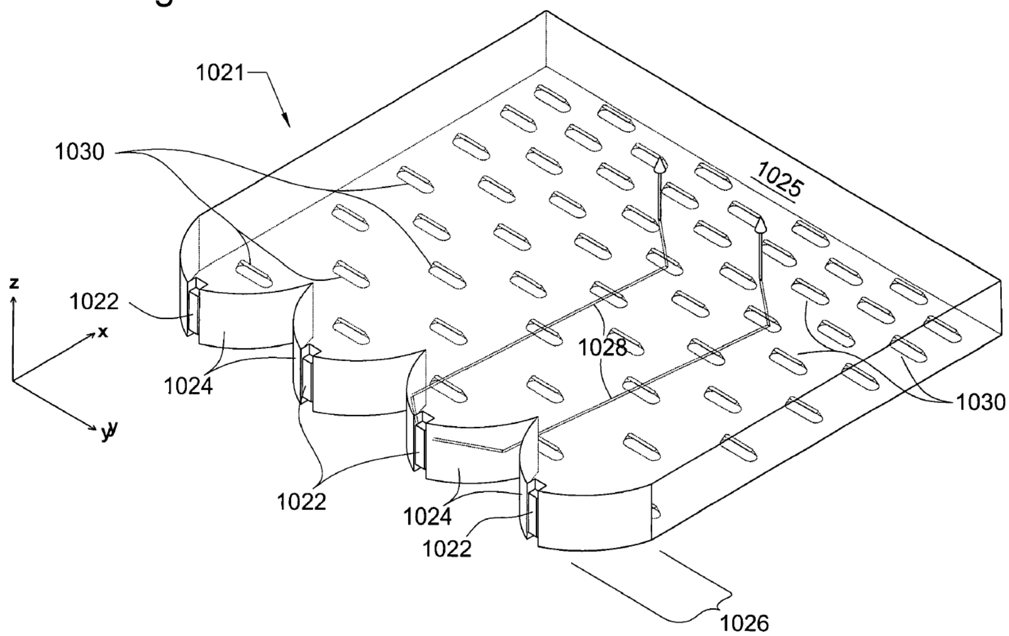
Id. at 74, Fig. 6.1. *Kobayashi* explains that "[t]he reflector sheet is disposed at the lower surface of the light guide (Figure 6.1) and has the function of reflecting light that has escaped from the light guide back to the light guide again." *Id.* at 81-82; *see also Abileah* at 29 ("The light reflected by the rear reflector includes not only the original emission from the lamps, but also any light that is reflected back into the cavity from higher surfaces. If that light is not reflected, it will be lost, thus affecting efficiency. Therefore, in many cases, the rear reflector also serves as a recycling function as well."); *Kunimochi* at 5:50-55 ("A light reflecting sheet 32 is disposed at one major surface, specifically a bottom surface (light reflecting surface) 2c of the light guide plate 2. The light reflecting sheet 32 is adapted to reintroduce into the light guide plate 2 light emitted from the LED 30 into the light guide plate 2 and leaking out from the bottom surface 2c.").

Indeed, as *Gandhi* explains, the "throughput efficiency" of prior art light guides is limited and "only 5 to 25% of the available illumination power in the backlight becomes available to the viewer." *Gandhi* at 6:22-25. *Gandhi*, however, teaches that, using its disclosure, "[t]hroughput

efficiencies as high as 75% can be achieved." *Id.* at 6:36. According to *Gandhi*, "[d]isplays with such improved throughput can deliver more brightness to the viewer at equivalent lamp powers, or conversely can deliver the same brightness by means of reduced power in the backlight compared to the prior art." *Id.* at 6:37-40. The result is that one of ordinary skill in the art would have been motivated to modify *Mitsuru* in view of *Gandhi*'s teaching of the benefits of using a reflective surface coextensive with the back surface of the light guide, to the extent such surface is not already included in *Mitsuru*. Ex. C ¶ 145.

One of ordinary skill in the art would have a reasonable expectation of success in modifying *Mitsuru*'s planar light-source light guide to include *Gandhi*'s reflector sheet. *Id.* ¶ 146. As discussed above, these sheets were well-known, conventional components of an LED backlight. *Id.*

Second, one of ordinary skill in the art would have been motivated to modify *Mitsuru* in view of *Gandhi*'s teaching of using a patterned layout of extraction elements on the back surface of the light guide, to the extent such pattern is not already disclosed by *Mitsuru*. *Id.* ¶¶ 147-149. Like *Mitsuru*, *Gandhi* teaches the use of "extraction elements . . . composed of wedge or prism like deflectors" on the back surface of a light guide. *Gandhi* at 8:49-51, Fig. 2A. According to *Gandhi*, "each deflector 205 is designed to intercept only a small portion of the total light flux that travels through the light guide." *Id.* at 8:56-58. *Gandhi* teaches that, "to ensure uniformity of the output, the deflectors are placed or distributed in a controlled fashion along the light guide, in some cases with a lower density of deflectors 205 near to the lamp source and a higher density of deflectors further from the lamp." *Id.* at 8:58-63. One exemplary layout is shown below.



Id. at Fig. 10B. According to *Gandhi*, the above backlight system "is another example of a backlight in which 3-dimensional control of angular divergence is established primarily by collimation out of a light injector 1026." *Id.* at 20:27-30. *Gandhi* discloses that "[a]ll of the deflectors 1030 are arranged with their long axes parallel to the y-axis, that is: the normal to the deflecting surfaces are contained within the x-z plane. The deflectors 1030 are arranged with unequal spacing in the light guide 1005. The closer spacing at distances further from the injector 1006 helps to ensure the uniformity of the emitted light." *Id.* at 21:13-18.

One of ordinary skill would have had a reasonable expectation of success in modifying *Mitsuru* in view of *Gandhi*'s patterns. Ex. C ¶ 148. Such patterns were well known in the prior art and a conventional feature of light guides. *Id.*; *Kobayashi* at 77-78 ("The pattern has the function of generating uniform emission intensity by appropriately diffusing the light rays in the light guide. The diffusion pattern is required to be imperceptibly small when viewed from the upper surface of the light guide . . . . Since the light guide contains more light rays in the vicinity of the LED

modules, the pattern is designed to have lower density in this region, and the density increases with increasing separation from the LED module."). One of ordinary skill would have also understood how to manufacture prisms or grooves to form the disclosed patterns. Ex. C ¶ 149. Indeed, *Gandhi* teaches that "[t]he prisms 401 and 451 can be produced as an integral part of plastic light guides by means of injection molding or stamping. The prisms can also be diamond turned or laser machined into glass or plastic. The reflective layers can be added after forming by physical or chemical vapor deposition (including the thin film techniques of evaporation or sputtering)." *Gandhi* at 12:36-42.

3. Claim 1

a. [1Pre]: "An edge-lit waveguide illumination system, comprising:"

As discussed in Section VII.A.2.a, *Mitsuru* discloses "[a]n edge-lit waveguide illumination system."

b. [1A]: "an optically transmissive plate having a flexible monolithic structure,"

As discussed in Section VII.A.2.b, *Mitsuru* discloses "an optically transmissive plate having a flexible monolithic structure."

c. [1B]: "a front surface,"

As discussed in Section VII.A.2.c, *Mitsuru* discloses "a front surface."

d. [1C]: "an opposing back surface extending parallel to the front surface,"

As discussed in Section VII.A.2.d, *Mitsuru* discloses "an opposing back surface extending parallel to the front surface."

e. [1D]: "a first edge,"

As discussed in Section VII.A.2.e, *Mitsuru* discloses "a first edge."

f. [1E]: "a second edge extending parallel to the first edge,"

As discussed in Section VII.A.2.f, *Mitsuru* discloses "a second edge extending parallel to the first edge."

g. [1F]: "a third edge extending perpendicular to the first and second edges,"

As discussed in Section VII.A.2.g, *Mitsuru* discloses "a third edge extending perpendicular to the first and second edges."

h. [1G]: "and a fourth edge extending parallel to the third edge,"

As discussed in Section VII.A.2.h, *Mitsuru* discloses "a fourth edge extending parallel to the third edge."

i. [1H]: "wherein a distance between the first and second edges is at least 40 times greater than a thickness of the optically transmissive plate"

As discussed in Section VII.A.2.i, *Mitsuru* discloses or renders obvious "wherein a distance between the first and second edges is at least 40 times greater than a thickness of the optically transmissive plate."

j. [1I]: "and a distance between the third and fourth edges is at least 20 times greater than the thickness of the optically transmissive plate;"

As discussed in Section VII.A.2.j, *Mitsuru* discloses or renders obvious "and a distance between the third and fourth edges is at least 20 times greater than the thickness of the optically transmissive plate."

k. [1J]: "a plurality of light emitting diodes optically coupled to the first edge and configured to emit a divergent light beam towards the first edge;"

As discussed in Section VII.A.2.k, *Mitsuru* discloses or renders obvious "a plurality of light emitting diodes optically coupled to the first edge and configured to emit a divergent light beam towards the first edge."

l. [1K]: "a lenticular array of linear cylindrical lenses formed in the front surface and extending along straight parallel lines between two opposing edges of the optically transmissive plate;"

As discussed in Section VII.A.2.l, *Mitsuru* discloses "a lenticular array of linear cylindrical lenses formed in the front surface and extending along straight parallel lines between two opposing edges of the optically transmissive plate."

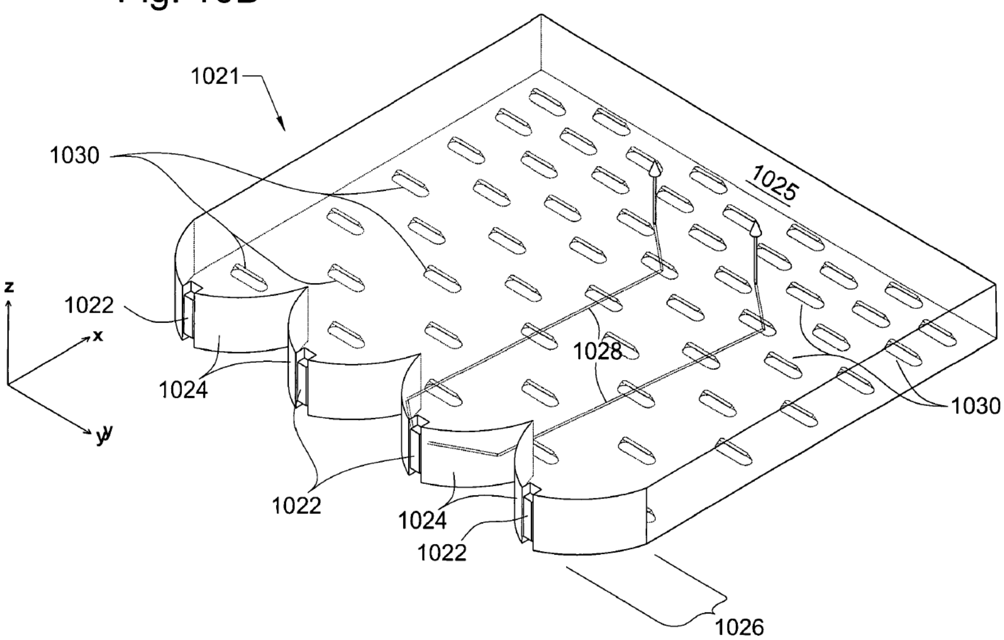
m. [1L]: "a plurality of discrete light extracting surface relief features formed in the back surface according to a two-dimensional pattern such that individual ones of the plurality of the discrete light extracting surface relief features are separated from one another and from each of the first, second, third, and fourth edges by smooth and planar portions of the back surface;"

The combination of *Mitsuru* and *Gandhi* renders obvious "a plurality of discrete light extracting surface relief features formed in the back surface according to a two-dimensional pattern such that individual ones of the plurality of the discrete light extracting surface relief features are separated from one another and from each of the first, second, third, and fourth edges by smooth and planar portions of the back surface." Ex. C ¶¶ 162-165.

As discussed in Section VII.A.2.m, *Mitsuru* discloses that light guide plate 2A includes "a plurality of prismatic reflection grooves 3 . . . provided on a back surface side." *Mitsuru* at [0023]. These reflection grooves are "formed at an average density of 25 grooves/mm^2 on one surface (bottom surface)." *Id.* at [0046].

As discussed in Sections VII.B.1 and VII.B.2, *Gandhi* teaches specific deflector (i.e., extraction structure or reflection groove) patterns "to ensure uniformity of the output." *Gandhi* at 8:58-63. *Gandhi* teaches that "the deflectors are placed or distributed in a controlled fashion along the light guide, in some cases with a lower density of deflectors 205 near to the lamp source and a higher density of deflectors further from the lamp." *Id.* One exemplary pattern is shown below:

Fig. 10B



Id. at Fig. 10B. In the above pattern, "[a]ll of the deflectors 1030 are arranged with their long axes parallel to the y-axis, that is: the normal to the deflecting surfaces are contained within the x-z plane. The deflectors 1030 are arranged with unequal spacing in the light guide 1005. The closer spacing at distances further from the injector 1006 helps to ensure the uniformity of the emitted light." *Id.* at 21:13-18.

Mitsuru's light guide plate, modified in view of *Gandhi* as discussed in Section VII.B.2, includes the above two-dimensional pattern of reflection grooves. Ex. C ¶ 165. One of ordinary skill in the art would have understood that, using *Gandhi*'s pattern, each individual reflection

groove is separated from other grooves and from each of the first, second, third, and fourth edges by smooth and planar portions of the back surface. *Id*.

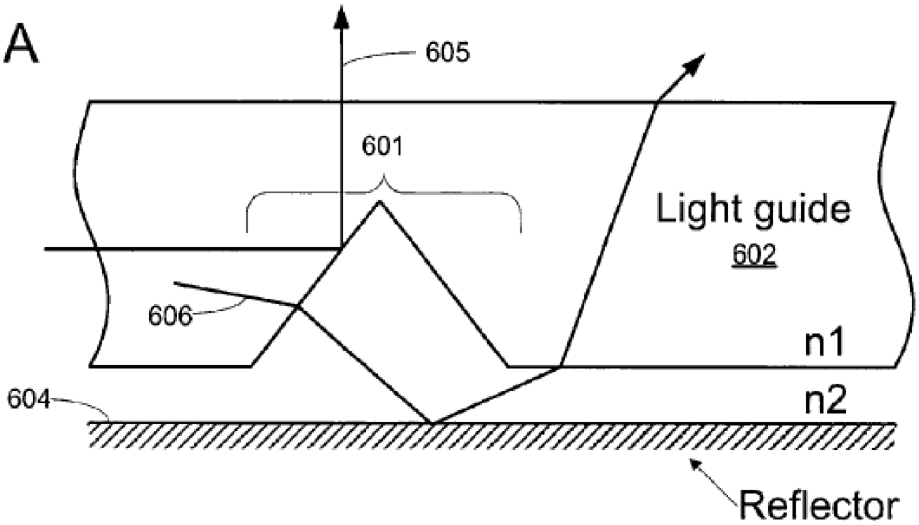
One of ordinary skill in the art would thus have understood that *Mitsuru* in view of *Gandhi* renders obvious "a plurality of discrete light extracting surface relief features formed in the back surface according to a two-dimensional pattern such that individual ones of the plurality of the discrete light extracting surface relief features are separated from one another and from each of the first, second, third, and fourth edges by smooth and planar portions of the back surface." *Id.* ¶¶ 162-165.

n. [1M]: "a reflective surface approximately coextensive with the optically transmissive plate and positioned on a back side of the optically transmissive plate; and"

The combination of *Mitsuru* and *Gandhi* renders obvious "a reflective surface approximately coextensive with the optically transmissive plate and positioned on a back side of the optically transmissive plate." *Id.* ¶¶ 166-167.

As discussed in Section VII.B.2, one of ordinary skill in the art would have been motivated to modify *Mitsuru* to further include a reflective surface positioned on the back side of *Mitsuru*'s light guide. *Gandhi*'s Figure 6A discloses one example of a reflective surface behind the back surface of the light guide. *Gandhi* at Fig. 6A. The light guide includes geometrical extraction structure 601, which is "suitable for inclusion in backlights used to form an improved optical cavit[y]." *Id.* at 14:24-28.

Fig. 6A



Id. at Fig. 6A. According to *Gandhi*, structure 601 is "associated with . . . a back-reflective surface 604." *Id.* at 14:43-45. One of ordinary skill would understand from the figure above and the written disclosure that this surface is approximately coextensive with the light guide plate. Ex. C ¶ 167. This "surface can be formed from either a metallic surface or from a dielectric mirror" and "separated from the light guides by an air gap." *Gandhi* at 14:45-53.

One of ordinary skill in the art would thus have understood that the combination of *Mitsuru* and *Gandhi* renders obvious "a reflective surface approximately coextensive with the optically transmissive plate and positioned on a back side of the optically transmissive plate." Ex. C ¶¶ 167-168.

o. [1N]: "a light diffusing layer approximately coextensive with the optically transmissive plate,"

As discussed in Section VII.A.2.o, *Mitsuru* discloses "a light diffusing layer approximately coextensive with the optically transmissive plate."

p. [1O]: "wherein the optically transmissive plate is configured to receive light on the first edge, guide the light received on the first edge towards the second edge using optical transmission and total internal reflection, and distribute the light received on the first edge from both the front and back surfaces towards divergent directions,"

As discussed in Section VII.A.2.p, *Mitsuru* discloses "wherein the optically transmissive plate is configured to receive light on the first edge, guide the light received on the first edge towards the second edge using optical transmission and total internal reflection, and distribute the light received on the first edge from both the front and back surfaces towards divergent directions."

q. [1P]: "wherein the optically transmissive plate is further configured to receive light on the front surface and propagate the light received on the front surface towards the back surface,"

As discussed in Section VII.A.2.q, *Mitsuru* discloses "wherein the optically transmissive plate is further configured to receive light on the front surface and propagate the light received on the front surface towards the back surface."

r. [1Q]: "wherein an area occupied by each of the linear cylindrical lenses is substantially greater than an area occupied by each of the plurality of the discrete light extracting surface relief features,"

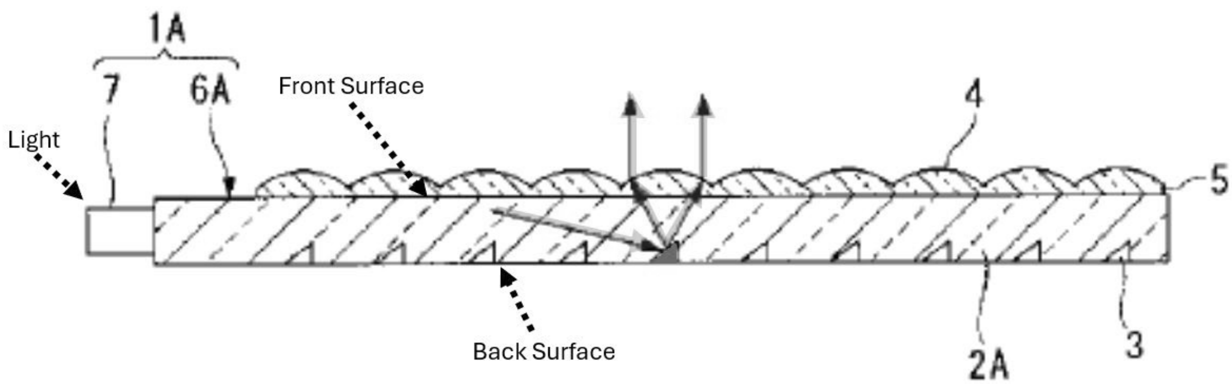
As discussed in Section VII.A.2.r, *Mitsuru* discloses "wherein an area occupied by each of the linear cylindrical lenses is substantially greater than an area occupied by each of the plurality of the discrete light extracting surface relief features."

s. [1R]: "and wherein at least one of the plurality of discrete light extracting surface relief features is configured to disrupt total internal reflection at the back surface and extract at least some light propagated in the optically transmissive plate towards the reflective surface."

The combination of *Mitsuru* and *Gandhi* renders obvious "and wherein at least one of the plurality of discrete light extracting surface relief features is configured to disrupt total internal

reflection at the back surface and extract at least some light propagated in the optically transmissive plate towards the reflective surface." *Id.* ¶¶ 172-175.

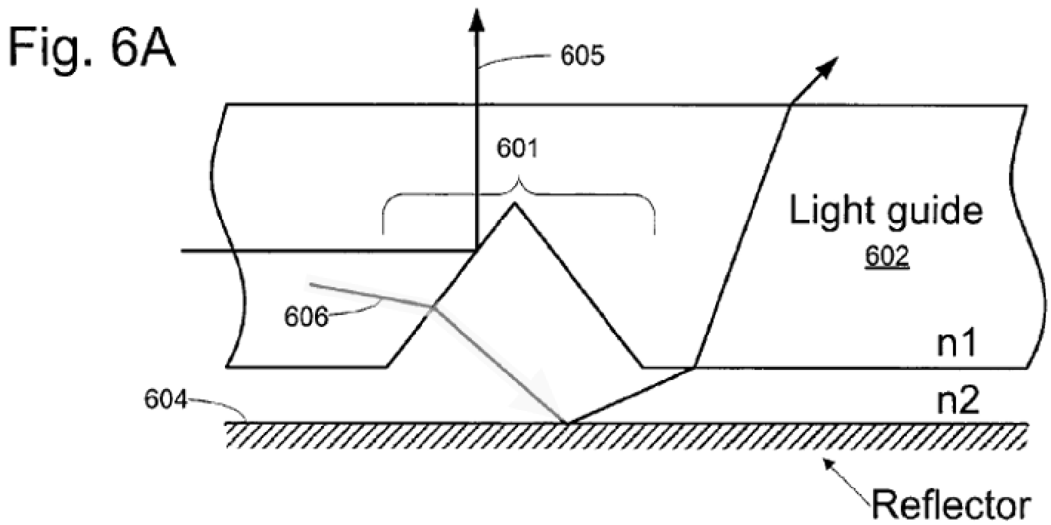
Mitsuru discloses that "light that entered from the side surface side and propagated is reflected to the front surface side by means of the prismatic reflection grooves 3 provided on the front surface side of the light guide plate 2A." *Mitsuru* at [0027]. This is illustrated below, where the highlighted reflection groove disrupts total reflection (i.e., "total internal reflection") at the back surface:



Id. at Fig. 1 (annotated). The light reflected off the reflection groove is light that was propagated in the optically transmissive plate towards the back and reflective surfaces. Ex. C ¶ 173. But, due to the presence of the reflection grooves, that light is "extract[ed]" out of the waveguide and reflected toward the lens array. *Id.*

As discussed in Section VII.B.3.n, *Mitsuru* as modified in view of *Gandhi* would include a reflective surface that is positioned coextensive with the back surface. *Gandhi* illustrates how, using this reflective surface, at least one reflection groove is configured to disrupt total internal reflection at the back surface and extract at least some light propagated in the optically transmissive plate towards the reflective surface. According to *Gandhi*, "[l]ight ray 606 illustrates a ray that is

refracted at the interface between the light guide 602 and the outside medium." *Gandhi* at 14:63-65.



Id. at Fig. 6A (annotated). "Light ray 606 is subsequently reflected from back reflective surface 604 and re-inserted into the light guide." *Id.* at 14:65-66.

One of ordinary skill in the art would have understood that this extraction toward the reflective surface would occur irrespective of whether the combination includes *Mitsuru*'s reflection grooves patterned as disclosed by *Gandhi* or *Gandhi*'s geometrical extraction structures 601 in the same pattern. Ex. C ¶ 175. In either case, some light rays will reflect toward the front surface (if they strike the prism at an appropriate angle) and some will be extracted toward the reflective surface and back into the guide. *Id.*; *see, e.g.*, *Gandhi* at Fig. 6A (illustrating ray 605 reflecting toward the front surface and ray 606 refracting toward the back surface). And as discussed in Section VII.A.3.a, *Mitsuru* further discloses that the reflection grooves have "heights of 3-20 µm." *Id.* at [0046]. *Mitsuru* teaches that this range is preferred because "[i]f the size of the reflection grooves 3 is above this range, then it becomes more difficult for the lenses 4 to condense light, and if the size is below this range, then the number of grooves for obtaining the required

brightness is excessively large, and processing also becomes difficult." *Id.* Thus, even if one of ordinary skill in the art would have been motivated to modify *Mitsuru*'s light guide plate to use *Gandhi*'s geometrical extraction structures, the ordinary artisan would likewise be motivated to maintain consistent dimensions in the modified light guide plate. Ex. C ¶ 175.

One of ordinary skill in the art would thus have understood that the combination of *Mitsuru* and *Gandhi* renders obvious "and wherein at least one of the plurality of discrete light extracting surface relief features is configured to disrupt total internal reflection at the back surface and extract at least some light propagated in the optically transmissive plate towards the reflective surface." *Id.* ¶¶ 172-175.

4. Claim 16

a. "An edge-lit waveguide illumination system as recited in claim 1, wherein a focal length characterizing at least one of the linear cylindrical lenses is less than a distance between the lenticular array and the plurality of discrete light extracting surface relief features."

As discussed in Section VII.A.3.a, *Mitsuru* discloses or renders obvious "wherein a focal length characterizing at least one of the linear cylindrical lenses is less than a distance between the lenticular array and the plurality of discrete light extracting surface relief features."

VIII. CONCLUSION

For the foregoing reasons, Acer requests reexamination and cancellation of claims 1 and 16 of the '135 patent.

Acer is willing to provide appropriate assistance to permit the Examiner to address and decide the issues presented by this Request. As the M.P.E.P. explains, the Examiner may, when appropriate, cut and paste claim charts or other material within the Request to incorporate them within the body of an Office Action. M.P.E.P. § 2262. Acer is, thus, through the undersigned

counsel, available to provide the Examiner with a digital copy of this Request, or any portion of it, in response to a request by email or phone. Acer also understands that the Examiner may, in appropriate circumstances, set forth specific rejections in an Office Action and incorporate by reference Acer's reasons for the proposed rejections, if the Examiner agrees with the proposed rejections and reasons supporting them.

If there is any additional fee due in connection with this filing that is not already submitted herewith, please charge the fee to Deposit Account No. 06-0916.

Respectfully submitted,
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP

Dated: November 26, 2024

By: /Joshua L. Goldberg/
Joshua L. Goldberg
Reg. No. 59,369

Attachments: (1) Certificate of Service to Patent Owner
(2) Information Disclosure Statement Form PTO/SB/08
(3) Exhibits listed on page iii of this Request